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United States

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OCTOBER TERM, 1966

No. 1007

HARRY P. LOCKLIN and ELMER J. BRANT, general partners doing business under the firm name of Radiant Color Company,

Petitioners,

vs.

SWITZER BROTHERS, INC., a corporation,

Respondent.

PETITION FOR THE WRIT OF CERTIORARI to the United States Court of Appeals for the Ninth Circuit

CARL HOPPE,
2610 Russ Building,
San Francisco, California 94104,
Attorney for Petitioners.

PERNAU-WALSH PRINTING CO., SAN FRANCISCO

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No.

HARRY P. LOCKLIN and ELMER J. BRANT, general partners doing business under the firm name of Radiant Color Company,

Petitioners,

vs.

SWITZER BROTHERS, INC., a corporation,

Respondent.

PETITION FOR THE WRIT OF CERTIORARI
to the United States Court of Appeals for the Ninth Circuit

Petitioners pray that the writ of certiorari issue to review the judgment of the United States Court of Appeals for the Ninth Circuit entered in this cause on October 24, 1966, as well as an interlocutory judgment of that Court entered on November 16, 1961.

OPINIONS BELOW

The opinion of the Court of Appeals made on October 24, 1966, is reported at 368 F.2d 553 and is reprinted in the Appendix, page 71a. The opinion of the District Court is reported at 152 USPQ 49 and is reprinted in the Appendix, page 58a.

The earlier interlocutory opinion of the Court of Appeals is reported at 299 F.2d 160 and is reprinted in the Appendix, page 22a. The first opinion of the District Court is reported unofficially at 125 USPQ 515 and is reprinted in the Appendix, page 1a.

JURISDICTION

The judgment of the Court of Appeals was entered on October 24, 1966 [74a]. A timely petition for rehearing was denied on November 30, 1966 [R. 168]. Jurisdiction of this Court is invoked under 28 U.S.C. Section 1254(1). Jurisdiction in the District Court was based on 28 U.S.C. Sections 1338(a) and 2201.

Jurisdiction of this Court to review the interlocutory judgment of the Court of Appeals entered on November 16, 1961 [42a], is based upon *Mercer v. Theriot* (1964), 377 U.S. 152, 153-154; *Kellogg Co. v. Nat. Biscuit Co.* (1938), 305 U.S. 111, 115-116; and *Panama Railroad v. Napier Shipping Co.* (1897), 166 U.S. 280, 283-284.

QUESTIONS PRESENTED

1. Is the time not ripe for this Court to re-establish the vitality of the rules requiring definite claiming and to reassure the public that it has the right to rely upon the statutory standard imposed by the Congress requiring a precise definition of the patent monopoly in accordance with 35 U.S.C. 112? Or, have the lower courts so far relaxed the standards announced in a line of cases beginning with *Gen. Electric Co. v. Wabash Co.* (1938), 304 U.S. 364, as to warrant the active supervision of this Court?

2. Where the novelty for which a patentee contends is that a patented resin is both thermoplastic and insoluble, does a claim which recites that a broadly classified essential ingredient is present in an amount "sufficient to render" said resin "substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting" comply with that provision of Section 112 requiring claims "particularly pointing out and distinctly claiming" the invention?

3. Where an opinion upholds validity upon the premise that the words "substantially insoluble in aromatic hydrocarbon solvents" mean that the resin is one "which . . . is capable of being finely ground and which remains insoluble without agglomeration in aromatic hydrocarbon solvents," is it proper to find a person guilty of contempt for making a resin which agglomerates in benzene, an aromatic hydrocarbon solvent, upon the new premise that "all resins of this type will eventually agglomerate in any pure aromatic hydrocarbon solvent. The stronger the solvent the less time it will take to agglomerate."?

4. Where validity of a patent is premised upon "a simple, clear test for an ordinary chemist to perform and one which does not require extensive experimentation in order that the precise critical limits be ascertained in a particular case," is it proper to hold a person in contempt upon the results of a plurality of experiments, none of which is specified in the patent, where the criteria as to which experiments should be accepted or rejected are found to go only to the weight of the evidence?

STATUTORY PROVISIONS INVOLVED

That portion of U.S. Code, Title 35, Section 112, which recites:

> "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."

That portion of U.S. Code, Title 35, Section 282, which recites:

> "The following shall be defenses in any action involving the validity or infringement of a patent and shall be pleaded:
>
> * * * * * * *
>
> "(3) Invalidity of the patent or any claim in suit for failure to comply with any requirement of sections 112 or 251 of this title,"

STATEMENT OF THE CASE

The judgment below holds petitioners in contempt for violating an injunction prohibiting them from infringing the Kazenas patent owned by respondent.

The Kazenas patent is for a thermoplastic resin which is a condensation product of three chemical components; to-wit, an aldehyde, a sulfonamide and a melamine compound. The claims call for an amount of melamine "sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting" [24a-25a].

On the original appeal, the Court of Appeals sustained the validity of that patent, overruling the defenses, among others, that the Kazenas resin lacked patentable novelty over a prior Japanese resin and that the claims did not comply with U.S. Code, Title 35, Section 112.

In discussing patentable novelty, the Court of Appeals, quoting the District Court, found that, "Both the Japanese resin and the Kazenas resin are composed of a sulfonamide, an aldehyde and melamine, but in critically different proportions. The most significant difference is in the amount of melamine. . . ." [25a-26a].

That most significant difference is claimed only in the functional and indeterminate phrase quoted above. In its opinion sustaining validity, the Court of Appeals delineated that functional phrase as meaning that the Kazenas resin is one "which . . . is capable of being finely ground and which remains insoluble without agglomeration in aromatic hydrocarbons." [24a].

The Court referred to experiments of respondent's expert, Dr. Hatcher, on the Japanese patent and, again quoting the District Court, it found that "The Japanese resin differs [from the Kazenas resin] in at least one vital respect in that it is soluble in aromatic hydrocarbons, while the Kazenas resin is substantially insoluble" [25a]. The Court, further quoting the District Court, found that "it could not have been anticipated that sufficient melamine could be used to achieve substantial insolubility in aromatic hydrocarbon solvents without simultaneously making the resin thermosetting." [28a]. Thus, the finding of patentable novelty required the functional and indeterminate words of the Kazenas claims.

The Court of Appeals distinguished *Gen. Electric Co. v. Wabash Co.* (1938), 304 U.S. 364, and invoked *Minerals Separation, Ltd. v. Hyde* (1916), 242 U.S. 261. In so doing, it noted that "the novelty for which Switzer contends is that this resin is both thermoplastic and insoluble"; gave heed to Switzer's pointing out that "the alternative [to the functional language] would have been to state the critical limits precisely"; sustained Switzer's assertion that it is "wholly unreasonable to expect claims to be specific in this respect" and excused "this failure to specify the critical limits precisely." [29a-32a].

The Court mentioned, but did not identify, "a simple, clear test for any ordinary chemist to perform and one which does not require extensive experimentation in order that the precise critical limits be ascertained in a particular case." [32a]. In discussing respondent's claim for a considerable number of melamine compounds, the Court again pointed out that "the ascertainment of these specific

limits in a particular case did not require extensive or undue experimentation." [37a].

Thus the Court of Appeals found validity notwithstanding its manifold recitation of facts showing that the claims themselves did not particularly point out and distinctly claim the subject matter which Kazenas regarded as his invention, as specified in U.S. Code, Title 35, Section 112. The Court shifted that statutory duty from Kazenas to the public merely because it would be a wholly unreasonable burden upon the patentee. The opinion does not cite any authority which justifies a monopoly upon a broad product line so confusingly similar to the prior art that the public cannot even locate the metes and bounds carving the monopoly area out of the public commons unless it first delineates indeterminate words, such as "amount sufficient to render" and "substantially insoluble", by experimental testing.

A petition for the writ of certiorari, filed in the October Term 1961, No. 803, urged conflicts with *Gen. Electric Co. v. Wabash Co.* (1938), 304 U.S. 364; *Halliburton Co. v. Walker* (1946), 329 U.S. 1; and *Standard Brands v. Yeast Corp.* (1939), 308 U.S. 34; cited *United Carbon Co. v. Binney Co.* (1942), 317 U.S. 228; and distinguished *Minerals Separation, Ltd. v. Hyde* (1916), 242 U.S. 261. In opposition, respondent urged in part, "The qualities or properties possessed by the patented resin of being thermoplastic rather than thermosetting, and of being substantially insoluble in aromatic hydrocarbon solvents are not ultimate functions expressed in terms of performance in end use. Instead, they are benchmarks, just as would be a designated melting point. . . ." [Brief in Opposition,

p. 7]. This Court denied the petition and rehearing (1962), 369 U.S. 861, 891.

Subsequent to that first decision, petitioners marketed a new resin which was different from that originally held to infringe [55a]. The District Court held that petitioners were again infringing and were guilty of contempt [43a]. On an intermediate appeal, the Court of Appeals remanded the case with instructions "that trial be had upon the sole question whether in the [accused] 4-C resin, the amount of melamine utilized is such as to bring the resin within the limits of the claims of the Kazenas patent as those claims are delineated in our former opinion." [57a, 72a]. The Court also characterized its prior ruling, e.g., that "the use of this functional language in specifying the amount of melamine required . . . did not invalidate the claims, but by the same token it served to fix precisely the limits of the claims." [56a-57a, 72a].

The District Court then tried the special issue and again held petitioners in contempt [58a]. The Court of Appeals affirmed the judgment for the reasons set forth in the memorandum opinion of the District Court [71a, at 73a].

Petitioners urge that the concurrent findings thus made show on their face that the accused resin did not meet the standard delineated in the original opinion. Recognizing the fact that the accused resin did not remain insoluble without agglomeration in aromatic hydrocarbons, the findings note that the "more reliable" tests of petitioners show that an accused JS-738 resin "placed in benzene on September 3, 1965 . . . appeared to be agglomerated at the time of trial [October 11 to 15, 1965]" [63a, 64a]. But

ignoring the original standard on which validity was sustained, both courts rejected "The mere fact that resin agglomerates within four or more weeks in a pure aromatic hydrocarbon solvent, such as benzene." [64a-65a]. They now found concurrently that "all resins of this type will eventually agglomerate in any pure aromatic hydrocarbon solvent. The stronger the solvent the less time it will take to agglomerate." [64a]. Neither court attempted to resolve the conflict between the new findings and the earlier finding upon which validity was sustained. That finding [24a] that "The Kazenas resin is one which . . . remains insoluble without agglomeration in aromatic hydrocarbon solvents" was silently brushed aside in both contempt opinions. Yet, both courts concurrently noted [64a] that petitioners relied "greatly upon the test" directed to the very standard established by that finding. Neither court permitted petitioners to rely upon this "benchmark" upon which validity was sustained.

Instead new "benchmarks" were set to embrace petitioners' new resin. Both courts referred to a plurality of experiments and found that "when taken together, the 24 hour and 17 day qualitative tests conducted by Switzer, and the qualitative tests conducted by Radiant which showed that their JS-738 resin was free flowing and dispersed in toluene and xylene after approximately seven weeks, are simple clear reliable tests, which demonstrate that, in fact, the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents." [66a]. Neither court mentioned, or could mention, any language in the patent claims or specifications which limits aromatic hydrocarbons to toluene or xylene or which identifies a resin as being

"substantially insoluble" if it will remain free flowing in such mild solvents as toluene and xylene for 24 hours, 17 days, approximately seven weeks, or any other temporary period. The patent shows on its face that there is no such instruction [75a].

Petitioners, in part because of the evidence adduced by respondent at the contempt trial, asked the Court of Appeals to reexamine its original determination that the claims were sufficiently precise. The Court declined to do so [73a]. Petitioners also asked the Court of Appeals, on petition for rehearing, to resolve the irreconcilable conflict between the critical findings which that Court made to uphold validity and those which it adopted to uphold contempt [R. 167]. That petition was denied [R. 168].

REASONS FOR GRANTING THE WRIT

1. There is a pressing need for this Court to breathe life into U.S. Code, Title 35, Section 112. This Court in *Gen. Electric Co. v. Wabash Co.* (1938), 304 U.S. 364; *Standard Brands v. Yeast Corp.* (1939), 308 U.S. 34; *United Carbon Co. v. Binney Co.* (1942), 317 U.S. 228; and *Graver Mfg. Co. v. Linde Co.* (1949), 336 U.S. 271, made it abundantly clear that compliance with U.S. Code, Title 35, Section 33 at the time, now Section 112, is essential to a valid patent claim and that the standards of that statute require precision and definiteness of claim language. In *General Electric,* this Court spoke out against the use of functional language at the exact point of novelty; in *United Carbon,* this Court condemned the comparative words "substantially pure", "commercially

uniform", and "comparatively small" and held that "An invention must be capable of accurate definition, and it must be accurately defined, to be patentable"; in *Standard Brands,* this Court held that the patentee could not compel experimentation to ascertain the boundaries of the patent monopoly; and in *Graver,* this Court made clear that the statute does not permit one to limit a broad chemical classification by reference to the patent specification. In the Patent Act of July 19, 1952, the Congress echoed these views by making "failure to comply with any requirement" of Section 112 a specific defense to any patent infringement action [U.S. Code, Title 35, Section 282(3)].

The cases reaching the appellate level since the earlier denial of the writ in this case show that the voice of this Court, as expressed in the cited line of authority, and the reprise of the Congress, as expressed in the Patent Act of 1952, are being diluted almost to the vanishing point.

For the five years 1962 through 1966, counsel for petitioners has been able to locate 14 cases in which the statutory standard was presented to appellate courts [80a-86a]. The statutory standard was actually applied to invalidate non-conforming patents in only two (14%) of these cases. In eleven cases (86%), mandatory compliance with the statutory standard was excused. In two of those eleven cases, judgments of trial courts were reversed because the lower courts applied the statutory standard.

This is in sharp contrast with the statistical data for the five year period following the pronouncement of *United Carbon* in 1942. For the five years 1943 through 1947, counsel has been able to locate 21 cases in which the statutory standard was considered by appellate courts

[86a-91a]. On the Court of Appeals level, the statutory standard was actually applied to invalidate non-conforming claims in eleven and one-half (55%) of these cases and was excused in nine and one-half (45%) of the cases. Two of these nine and one-half cases were reversed by this Court, one on the statutory defense and the other for want of novelty, increasing mandatory compliance to twelve and one-half (60%) and decreasing net excuses to seven and one-half cases (36%) of the overall total.

Thus, comparing the first five year period with the current five year period, the percentage of cases applying the statutory standard has been reduced from 60% to 14% overall while the percentage excusing the statutory standard has been increased from 36% to 86% overall.

The statistical data thus compared are reflected in the number and content of the petitions made to this Court. During the five year period following *United Carbon*, adjudicated infringers sought review in only four instances (20%) out of the 21 cases and obtained reversal in two of them, one reversal being based on the statutory defense. Again, in sharp contrast in the five year period following the *Locklin* decision, adjudicated infringers have asked this Court to review the statutory defense in seven (50%) of fourteen cases. Thus, complaints that lower courts are not applying the statutory standard increased from four to seven, although the total number of appellate cases which considered the statute lessened from 21 to 14 for the respective five year periods.

Petitioners do not, by these statistics, urge that any one or all of the cases rejecting the statute cited in the appendix is or are wrong. But they do urge that the statis-

tics clearly show that litigants of today are being deprived of the same benefit of the statute as that afforded two decades ago when the mandates of this Court were still fresh.

Petitioners submit that, "Special and important reasons for the grant of certiorari . . . are certainly present when lower federal . . . courts persistently deprive litigants" of their right "to insist upon the precision enjoined by the statute" [*Rogers v. Missouri Pacific R. Co.* (1957), 352 U.S. 480, 510, considered in the context of *United Carbon Co. v. Binney Co.* (1942), 317 U.S. 228, 232-233].

2. This case offers a reliable vehicle for this Court to express its present views on the vitality of the statutory standard set forth in U.S. Code, Title 35, Section 112. This case, within its four corners, represents the most extreme departure from the precision demanded by the statute which is recorded on the books at least for the past five years and perhaps for the entire period since the rendition of the cited line of authority. The opinions below are plainly wrong on a broad front.

a. The Court of Appeals candidly recognized that "the novelty for which Switzer contends is that this resin is both thermoplastic and insoluble." [29a]. But this Court in *General Electric* held without qualification that the statutory standard is not met "when the inventor is painstaking when he recites what has already been seen, and then uses conveniently functional language at the exact point of novelty." [304 U.S. at p. 372].

b. The original opinion approves "a simple, clear test for an ordinary chemist to perform and one which does

not require extensive experimentation in order that the precise critical limits be ascertained in a particular case." [32a]. The concurrent opinion finding contempt approves a plurality of "simple clear reliable tests" but it "in no wise suggests that the above tests represent the minimum standard for determining the question presented . . ." [66a]. But this Court in *Standard Brands* confirmed that the disclosure of a patent is too vague and indefinite to constitute invention when "both the times and manner in which the concentrated nutrients solution is to be added may be ascertained as we have stated solely by experimentation." [308 U.S. at p. 38].

c. The original and the contempt opinions taken together show on their face that the phrase "substantially insoluble in aromatic hydrocarbons" is indeterminate. In sustaining validity, the Court of Appeals found that the Kazenas resin "remains insoluble without agglomeration in aromatic hydrocarbon solvents." [24a]. In finding contempt, the concurrent findings are that "all resins of this type will eventually agglomerate in any pure aromatic hydrocarbon solvent" and consequently reject "the mere fact that resin agglomerates within four or more weeks in a pure hydrocarbon solvent, such as benzene, . . ." [64a]. But this Court in *United Carbon* held that claims were "so indefinite as not to give the notice required by the statute" where they used such indeterminate definitions as "substantially pure," "commercially uniform", and "comparatively small" [317 U.S. at p. 233].

d. The original opinion, the claims, and the patent specifications all treat aromatic hydrocarbon solvents as a single class without limitation to weak aromatics and ex-

clusion of strong ones. The contempt opinion rejects tests for agglomeration made in benzene [64a] and relies on experiments made with toluene and xylene [66a]. But this Court in *Graver* held that claims could not even be qualified by the specification to comprehend only members of a claimed class which had been proven operative [336 U.S. at pp. 276-277].

e. The claims call for a melamine compound as a single class. That class encompasses a "considerable number of melamine compounds" [31a]. The District Court in the first instance recognized that respondent "has not shown that all the members of each class are operative" but refused to place "such a burden on the defender of a patent" [14a-15a]. The Court of Appeals agreed [37a]. But in *Corona Co. v. Dovan Corp.* (1928), 276 U.S. 358, at p. 385, this Court held that the patentee must show that all members of a claimed chemical class are able to produce the claimed result.

Thus, within the four corners of the original and contempt opinions, the Court of Appeals has stated or adopted facts which demonstrate that petitioners have been found guilty of contempt for infringing claims which are fatally defective if the precision demanded by the statute and the case law is mandatory. The decisions below, therefore, supply a sound vehicle with which this Court may reestablish its own and Congress' views that failure to comply with the statute is an absolute bar to a claim for infringement.

3. The errors in this case arising out of the failure of the courts below to insist upon that precision enjoined by 35 U.S.C. 112 transcend the immediate rights of the

private litigants in this specific case in at least two respects.

First, the original decision of the Court of Appeals has already been followed in other patent litigation, affecting not only private litigants but the Patent Office and the Government as well.

In *Application of Caldwell* (C.C.P.A. 1963), 319 F. 2d 254 the Board of Appeals of the Patent Office rejected a series of patent application claims which defined the critical amount of an ingredient in the words ". . . an effective amount of aspirin for growth stimulation." The court reversed the decision of the board stating, page 258, that ". . . such definitions are not only common but have been expressly approved in many cases . . ." citing *Locklin* as well as other cases. The cases of this Court cited above were ignored. Chief Judge Worley dissented from that holding.

Yosemite Chemical Company v. United States (Court of Claims 1966), 360 F. 2d 948, confirmed a trial commissioner's report recommending recovery against the Government for infringement of a patent asserted to conflict with 35 U.S.C. Section 112. In overruling that defense, the court in part relied upon *Locklin,* holding that the claims ". . . would pose no particular problems in application. . . ." (page 952). The cases of this Court cited above were again ignored.

Spee-Flo Manufacturing Corporation v. Gray Company (S.D. Texas 1964), 237 F.Supp. 616, affirmed *Gray Company v. Spee-Flo Manufacturing Corporation* (5 Cir. 1966), 361 F. 2d 489, involved the defense of non-compliance with the statute. The District Court, relying in

part upon *Locklin* (237 F.Supp. 622), found that ". . . The fact that some such experimentation may be required by the operator—or that an unskilled operator may continue to get unsatisfactory results because of the variables involved—does not render the patent invalid for uncertainty. . . ." The cases of this Court cited above were still further ignored.

If petitioners are correct in urging that the decisions below are in error in excusing compliance with 35 U.S.C. Section 112, it is important to the public that the already emerging effectiveness of *Locklin* as continuing precedent should be destroyed by the grant of the writ in this case before it supports and nurtures still further inroads upon the statute.

Second, the decisions below stand as a red flag warning workers in the resin art to avoid any area which might be thought remotely related to the Kazenas claims. The Court of Appeals noted well in its original opinion that the Kazenas patent encompassed a "considerable number of melamine compounds" and that each of these "has a different critical limit" [31a]. Its reference to "a simple, clear test" in the original decision [32a] was clouded and made indeterminate in the contempt opinion. There the Court of Appeals informed the entire community, as well as petitioners, that such factors as ". . . quantity of material tested; nature of the melamine compound used; length of time during which the resin remained insoluble and free flowing . . .", go not to the relevance of the test evidence, but to its weight [73a]. Certainly no one can dare use any resin in an area where tests for infringement are so loosely definable that one must anticipate how much

weight a court may give to his test data. Particularly is this true when the court does not specify "the minimum standard for determining the question presented" [66a]. The grant of the writ in this case may serve to open to the public that indefinable area made fallow by the present opinions below. This Court should, petitioners submit, revoke respondent's "hunting license" which discloses "as little useful information as possible—while broadening the scope of the claim as widely as possible" [Cf. *Brenner v. Manson* (1966), 383 U.S. 519, 536, 534].

For the foregoing reasons, it is submitted that this petition for the writ of certiorari should be granted.

Respectfully submitted,

CARL HOPPE,

Attorney for Petitioners.

(Appendix Follows)

In the United States District Court
Northern District of California
Southern Division

Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, Plaintiffs, vs. Switzer Brothers, Inc., a corporation, Defendant.	Civil Action No. 36995

MEMORANDUM OF COURT*

[Filed Sept. 4, 1959]

Plaintiffs, manufacturers of fluorescent paints, having been notified by Defendant that certain of Plaintiffs' pigments infringed Defendant's resin Patent No. 2,808,954, instituted this action for a judgment declaring each of the claims of Defendant's patent invalid and not infringed by Plaintiffs' pigments. Defendant answered denying the claimed invalidity of its patent, and in a counterclaim alleged infringement of the patent by Plaintiffs and prayed for an injunction and damages.

*This is not an opinion for publication but is a memorandum, having little or no precedential value, of the Court's reasons for judgment, for the benefit of counsel.

The patent in suit, issued on October 15, 1957 to Zenon Kazenas and assigned to Defendant, is for a thermoplastic melamine-sulfonamide-formaldehyde resin and the process for making such resin. The Kazenas resin has a combination of properties that make it particularly useful for the manufacture of pigments. It is friable and readily grindable into a finely divided condition. It does not agglomerate during grinding inasmuch as it does not exhibit cold flow at room temperatures, and does not soften below 100° C. It is insoluble in common paint solvents such as aliphatic and aromatic hydrocarbons, and hence, can be suspended in such vehicles without coalescence or agglomeration. Yet it is soluble in ketones in which it can be dissolved to form coating compositions. When employed with certain fluorescent dyes in a pigment, the resin imparts superior light-fastness to the pigment.

The ingredients employed by Kazenas to make his resin had previously been in common use in the manufacture of resins, but they had not theretofore been combined in the manner disclosed in the Kazenas patent. Melamine had commonly been reacted with formaldehyde to make melamine aldehyde resins while sulfonamide had commonly been separately reacted with formaldehyde to make sulfonamide-aldehyde resins. The melamine-aldehyde resins are thermoset resins, that is, once having been set by heat, they are infusible upon further heating. The sulfonamide-aldehyde resins are thermoplastic, that is, capable of being fused or softened by heat. The thermoset melamine-aldehyde resins are so hard and tough that they are difficult to grind and are insoluble in aromatic and ali-

phatic hydrocarbons and in ketones. The thermoplastic sulfonamide-aldehyde resins have such a low melting point that they tend to agglomerate upon grinding and they are soluble in aromatic and aliphatic hydrocarbons and in ketones.

Prior to the disclosures of the Kazenas patent, it was understood by those skilled in the art of making resins, that melamine, sulfonamide, and formaldehyde were compatible in combination and that melamine-aldehyde resins could be modified by adding sulfonamide while sulfonamide-aldehyde resins could be modified by adding melamine. But, the literature introduced to show the state of the prior art, contains very meager teachings regarding particular combinations of melamine, sulfonamide, and formaldehyde that would produce specific results.

Plaintiffs concede that the Kazenas patent is not anticipated by any resin in the prior art, but it is contended that the Kazenas resin is not such an advance over the prior art as to constitute invention.

Of the prior art references cited by Plaintiffs, two relate to the modification of melamine-aldehyde resins by the addition of sulfonamide. One is the Widmer and Fisch Patent No. 2,197,357 for amino-triazine-aldehyde condensation products in which melamine is one of the preferred aminotriazines employed. The specification states that it is not necessary to use aminotriazine alone in the condensation, and that other compounds capable of forming resins with aldehydes, such as sulfonamides, may be added. The specification goes on to list a variety of properties which may be exhibited by the condensation products depending

upon the parent material selected and the conditions of the reaction. But, nowhere is there any intimation regarding the result that might be anticipated if sulfonamide were introduced in the condensation of melamine and formaldehyde. It is obvious that the Widmer-Fisch patent is of little consequence in appraising the Kazenas resin as an invention.

The other reference relating to the modification of melamine-aldehyde resins by sulfonamides is an article by Bergen and Craver in the September, 1947 issue of Industrial and Engineering Chemistry entitled "Sulfonamide Plasticizers and Resins". This article discusses generally the preparation, properties, and applications of sulfonamide plasticizers and resins. At one point, it comments that "Although the limits of compatibility are now shown here, it is known that the sulfonamides are compatible with, and in some cases actually enter into, the reaction of various theromsetting plastics such as urea-formaldehyde, melamine formaldehyde, and phenol-formaldehyde. Here they impart an increase flow or plasticity, which makes possible laminated punching stock or postformed articles, and decreased molding pressures and temperatures." Further on it states that "The sulfonamides are used by the plastics industry for plasticizing thermosetting resins, such as phenol-formaldehyde, urea-formaldehyde, melamine-formaldehyde, and copolymer-ester-type resins, so that better flow is obtainable and lower temperatures and pressures may be used." The entire import of this disclosure is that a thermosetting melamine-formaldehyde resin, when modified with sulfonamide, will flow at lower temperatures and pressures prior to becoming set,

but will still retain its character as a thermosetting resin. This disclosure certainly would not suggest the condensation of melamine, sulfonamide, and formaldehyde to obtain a thermoplastic resin such as the Kazenas resin.

The remainder of the prior art references relate to the modification of sulfonamide-aldehyde resins by the addition of melamine. Two of these references, the Bren Patent No. 1,961,579 and the Moss and White Patent No. 1,873,848 on their face, do not deal with the modification of sulfonamide-aldehyde resins with melamine. They describe modification by addition of urea, thiourea or guanidine. It is plaintiffs' contention that melamine is a chemical so closely analogous to urea, thiourea or guanidine that it could not constitute invention to substitute melamine for any one of the three. In support of this contention, plaintiffs cite a paragraph from Chemical Abstracts for January 20, 1946 which merely notes that a British patent discloses that when certain specified chemicals are heated together with one or more of such substances as urea, thioureas, guanidine, and aminotriazines, decorative or protective film-forming compositions are obtained. Plaintiffs also cite several published judicial opinions. Only two of these opinions are relevant at all, and they lend slim support to Plaintiffs' argument that it would be routine to substitute melamine for urea, thiourea, or guanidine. *In re Berger,* 143 F.2d 971, indicates that melamine-aldehyde resins and urea-aldehyde resins are analogous, but do not function in the same way in all circumstances. *In re West,* 160 F.2d 570, merely suggests that urea, thiourea, and aminotriazines have sufficient common properties to warrant their being characterized as a class

in a particular application. It is readily apparent that Plaintiffs' references fall far short of teachings that melamine is so similar to urea, thiourea, or guanidine that one could substitute it for any one of the three in the making of resins and expect to obtain the same result.

But, even assuming that melamine were regarded in the art as the equivalent of urea, thiourea, and guanidine, the Bren patent and the Moss-White patent describing the modification of sulfonamide-aldehyde resins by addition of these substances would not suggest that the addition of melamine to a sulfonamide-aldehyde resin would produce a resin with the properties of the Kazenas resin. The Bren patent merely discloses that the formation of bubbles in products molded from a sulfonamide-aldehyde resin can be prevented by adding sufficient urea, thiourea, or guanidine to react with any aldehyde released in gaseous state when the resin is heated.

The Moss-White patent relates primarily to the preparation of a toluene sulfonamide-aldehyde resin compatible with derivatives of cellulose. A modification of this resin with urea is described as follows:

> "In another mode of carrying out our invention 5 to 10% of urea as [sic] added to the initial reactants, and the subsequent steps are carried out as already described. We have further found that this resin is not permanently fusible in the way in which this term is commonly used in resin literature. If the improved resin, as herein described, is held at a temperature of 160-200° C., preferably about 175° C., for from 4 to 8 hours, it is converted into a dark, greenish brown resin, which consists almost entirely of two crystalline

substances, both of which are largely insoluble in benzene. The exact composition and formula of these substances cannot be given. However, one of them, in the crude state in which it separates from the benzene solution, melts at 140-150° C., whilst the second one melts at 160-162° C., and on recrystallizing from alcohol or xylene it melts sharply at 165° C."

Plaintiffs contend that this description discloses that the modification of a sulfonamide-aldehyde resin with urea will produce a thermoplastic resin substantially insoluble in aromatic hydrocarbon solvents with a high melting point, similar to the Kazenas resin. But, the Moss-White disclosure is obscure in several respects. It is not at all clear that the statement that the resin "is not permanently fusible" means that it is thermoplastic, for this statement could be taken to mean that the resin is not permanently capable of being melted and is therefore thermosetting. The explanation that the resin consists of two components both largely insoluble in benzene, which separate independently from a benzene solution and individually recrystallize from xylene does not indicate that the described resin is a homogeneous resin, itself, substantially insoluble in aromatic hydrocarbons. Moreover, the described resin differs significantly from the clear Kazenas resin, in that it is a dark, greenish brown. It is not at all reasonable to assume that the Moss-White disclosure would point the way to the Kazenas resin even if melamine were taken to be the equivalent of urea.

The only prior art reference specifically describing the modification of a sulfonamide-aldehyde resin with melamine is the Japanese Patent No. 181,405 for a method of

producing a highly waterproof para-toluol-sulfamide resin of a high melting point.

The Japanese patent discloses that the reaction of para-toluol-sulfamide and formalin with a small amount of melamine will produce a resin which has greater waterproofness and a substantially higher melting point than a conventional para-toluol-sulfamide resin, but which retains the other characteristics of such a resin. The Japanese resin, as described in the patent, thus has properties similar to those of the Kazenas resin in that it is thermoplastic and has a relatively high melting point,[1] but it differs in at least one vital respect in that it is soluble in aromatic hydrocarbons, while the Kazenas resin is substantially insoluble. Both the Japanese resin and the Kazenas resin are composed of a sulfonamide, an aldehyde, and melamine, but in critically different proportions. The most significant difference is in the amount of melamine. The Japanese patent specifies a "small" amount of melamine which, in the single example set forth in the patent, is 5% by weight of the para-toluol-sulfamide employed. The Kazenas patent teaches the use of a substantial amount of melamine or melamine derivative ranging in amount from 11 to 50% by weight of the sulfonamide. Kazenas also teaches the use of a greater amount of aldehyde in relation to the sulfonamide.

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[1]A softening point of 122° C was claimed for the Japanese resin. Yet, Plaintiffs' expert and Defendant's expert testified that upon testing a sample of the Japanese resin prepared by them, they respectively found that it softened at 81° and 89° C. Consequently, if the patentable novelty of the Kazenas resin were dependent upon its melting point, the Court could not accept the Japanese patent as prior art in fact disclosing a method of modifying a sulfonamide-aldehyde resin with melamine to obtain a resin with a high melting point.

Plaintiffs urge that it did not constitute invention for Kazenas to vary the proportion of melamine and aldehyde to achieve substantial insolubility in aromatic hydrocarbons. But, the Japanese patent, itself, does not even suggest the possibility that a greater proportion of melamine and aldehyde might produce a resin substantially insoluble in aromatic hydrocarbons. Indeed, it would discourage experimentation along these lines. Since the patent states that, except for greater waterproofness and a higher melting point, the Japanese resin does not lose the characteristics of a conventional para-toluol-sulfamide resin, one could only conclude that the modification with melamine does not affect its solubility in aromatic hydrocarbons.

It is possible that the mere fact that melamine-aldehyde resins were known to be insoluble in aromatic hydrocarbons might suggest to a skilled chemist that the modification of a sulfonamide-aldehyde resin with melamine might make the resin less soluble in aromatic hydrocarbons. But, it could not have been anticipated that sufficient melamine could be used to achieve substantial insolubility in aromatic hydrocarbons without simultaneously making the resin thermosetting. Nor, was there any basis for expecting that the reaction of melamine with sulfonamide and an aldehyde would produce a resin having the insolubility in aromatic hydrocarbons characteristic of a melamine-aldehyde resin, but retaining the ketone solubility characteristic of a sulfonamide-aldehyde resin.

The sum and substance of the teachings of the prior art, including the Japanese patent, was that the properties of melamine-aldehyde resin could be modified to some extent by adding a small amount of a sulfonamide, and that the

properties of a sulfonamide-aldehyde resin could be modified by adding a small amount of melamine. These teachings were narrow ones. They did not constitute such important and substantial discoveries that the ordinarily capable chemist could carry on from that point and in normal course produce the Kazenas resin.[2] The Kazenas patent discloses the new and broader concept that melamine and a sulfonamide, each in a relatively substantial quantity, could be reacted together with an aldehyde to produce a distinct resin having some of the properties of a sulfonamide-aldehyde resin and some of the properties of a melamine-aldehyde resin, and other properties which are unique. The Kazenas resin represented a new arrangement of ingredients that produced a new, unexpected and useful result. The Court is satisfied that it was such an advance over the prior art as to constitute invention.

Apart from their contention that the Kazenas resin did not amount to an invention, Plaintiffs contest the validity of the Kazenas patent on the basis of several claimed defects in the patent itself.

Plaintiffs first urge that because the essence of the Kazenas invention is the relative proportions of the components of his resin, the patent lacks validity in failing to disclose or claim any critical limits. But, Plaintiffs' view could only be sustained by a hypercritical and piecemeal analysis of the patent. The Court is satisfied both from its own reading of the patent and the expert testimony,

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[2]Aluminum Co. of America v. Thompson Products, 122 F.2d 796 (6 Cir. 1941); Rohm & Haas Company v. Roberts Chemicals, 245 F.2d 693 (4 Cir. 1957).

that anyone with a modicum of skill in the resin art upon examining the Kazenas patent in its entirety would clearly understand that the relative proportions of melamine, sulfonamide, and aldehyde must be maintained within a limited range in order to produce a resin that would be thermoplastic, have a high melting point, and be substantially insoluble in aromatic hydrocarbons. The Court is further satisfied that the critical range is set forth with sufficient precision that anyone skilled in the art could readily perceive its limits.

Plaintiffs' expert testimony to the effect that the upper and lower limits specified in the patent are not in fact critical was not convincing. Upon cross-examination the testimony of Plaintiffs' expert tended to confirm the teaching of the patent that the melamine component should not exceed 50% by weight of the sulfonamide. The experiments performed by Plaintiffs' expert to test the properties of resin samples prepared in accordance with the examples in the Kazenas patent, in the opinion of the Court, are not reliable evidence to support Plaintiffs' contention that as one approaches the lower limit of the critical range within which the melamine content may be varied the proportion of melamine is inadequate to produce the aromatic hydrocarbon insolubility claimed by the patent. These experiments were limited in number. Some of the examples were admittedly not carried out strictly in accordance with the instructions. Some of the experiments which were repeated had inconsistent results that were not satisfactorily accounted for. There is an unexplained inconsistency in the testimony that the sample of example 3 was insoluble in toluene while the sample of

example 4 was not, although both samples call for an almost identical proportion of the melamine component.

Several asserted defects in the claims are contended by Plaintiffs to invalidate the Kazenas patent. It is urged that the claims are void because the maximum and minimum limits of the melamine compound are expressed partially in functional terms. The language complained of is that which states that the melamine compound should be "sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting." Plaintiffs cite a multitude of cases in support of the argument that this functional expression invalidates the claims. But, none of these cases holds that claims employing functional expressions to define the claimed invention are per se invalid. In all of the cases relied upon by Plaintiffs the claims were disapproved because under the particular circumstances the use of functional expressions either left the description of the invention too vague or made the claim broader than the invention. The functional expressions employed in the Kazenas claims do not have either of these objectionable results. When the general description, the specific examples, and the claims are read together, the invention is so plainly defined that no one skilled in the art should have any difficulty in practicing it. The expression of the maximum and minimum melamine content in functional terms limits the claims to the exact scope of the invention. Indeed, the functional expressions define the limits of the invention more precisely than would have been practically possible by wholly mathematical expressions.

Plaintiffs also urge that the inclusion in the claims of the expression that the amount of melamine compound is "sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents" invalidates the claims because the minimum melamine proportion is not described in the specification. This is simply a restatement of the argument that it was improper to claim the minimum melamine content in functional terms. For, as has been noted, it would be objectionable to claim an element of an invention in functional terms if the result was such that such element was inadequately described in the specification. But, it would be readily apparent to anyone skilled in the art from the description of the invention that a sufficient quantity of melamine would be just as essential to achieve aromatic hydrocarbon insolubility as it would be to obtain the high melting point which is specifically stated to be dependent upon adequate melamine. The specification affords an adequate guide as to what this minimum quantity should be. The general description and the specific examples teach that the melamine component content may be varied from 11 to 50 per cent by weight of the sulfonamide component depending upon the particular form of melamine component employed. It is stated that the preferred amount of unmodified B-state melamine-aldehyde resin, the form of melamine component to be used most sparingly, is one-fifth or 20% by weight of the sulfonamide component. The tenor of the description as a whole is that a fairly substantial amount of melamine component should be used. In this context, examples two and five, in which the specified amount of melamine is respectively 11% and 13% by

weight of the sulfonamide component, constitute an adequate guide as to the minimum amount of melamine that will be effective to render the resin substantially insoluble in aromatic hydrocarbons.

Plaintiffs further contend that the language that the amount of melamine compound is "sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents" invalidates the claims because it was added by amendment to the patent application without being supported by a supplementary oath and after intervening rights had accrued. There is no merit to this argument because the language complained of did not constitute new matter. The general description and the specific examples were included in the original application in substantially the same form as they appear in the patent. As has been previously stated, anyone skilled in the art could readily perceive from the general description and the examples that there would be a minimum amount of melamine necessary to render the resin substantially insoluble in aromatic hydrocarbons, even though the description does not say so in so many words. And, the description and examples sufficiently demonstrate what the minimum amount is.

Plaintiffs attack the validity of a number of the Kazenas claims which claim a large class of melamine components and a large class of sulfonamide components on the ground that defendant has not shown that all of the members of each class are operable. But Plaintiffs have cited no authority and the Court is aware of none that places such a burden on the defender of a patent. In all of the cases cited by Plaintiffs some members of the class

of compounds embraced by claims held to be invalid were in fact shown to be inoperative. Plaintiffs introduced no evidence showing that any members of the classes of compounds within the scope of the Kazenas claims are inoperative nor even any evidence that would suggest that some might be inoperative. Merely because the classes of components claimed are large ones is no basis for assuming that some of their members are inoperative.

The Court concludes that there is no invalidity in the Kazenas patent.[3] In respect to the issue of infringement, the record clearly sustains the contention of Defendant that Plaintiffs have infringed claims 1-4 and claim 9 of the Kazenas patent.

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[3]Since the Court has concluded that the Kazenas resin is not dependent for patentable novelty upon the fact that it is completely condensed, it is unnecessary to discuss Plaintiffs' argument that patentable novelty may not be predicated upon that feature of the Kazenas resin.

In the United States District Court
Northern District of California
Southern Division

Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, Plaintiffs, vs. Switzer Brothers, Inc., a corporation, Defendant.	Civil Action No. 36995 (Suit for Declaratory Judgment Based on Letters Patent No. 2,809,954)

FINDINGS OF FACT AND CONCLUSIONS OF LAW

[Filed Nov. 17, 1959]

This matter came before the Court on Complaint of the Plaintiffs asking for a declaratory judgment declaring each of the claims of Defendant's United States Letters Patent No. 2,809,954 to be invalid and not infringed by Plaintiffs.

Upon trial of said cause in open Court, January 14, 15 and 16, 1959, and upon full consideration of the testimony given on oral hearing, and of the pleadings, admissions, demonstrations and exhibits, and of the motions made in this cause, the Court finds as follows:

FINDINGS OF FACT

1. This is a suit for declaratory judgment based on Letters Patent No. 2,809,954, which was duly and legally issued on October 15, 1957, to Switzer Brothers, Inc., Defendant, assignee by mesne assignments of Zenon Kazenas, the patentee, for Thermoplastic Melamine-Sulfonamide-Formaldehyde Resinous Materials and Process for Making Same. Plaintiffs instituted this action for a judgment declaring each of the claims of Defendant's said patent to be invalid and not infringed by Plaintiffs' fluorescent pigments, marketed under the trademark, "Velva-Glo", or by Plaintiffs' method of making the same. Defendant answered by denying the alleged invalidity of said patent and counterclaimed for infringement, with prayer for an injunction against infringement, direct or contributory, and for damages.

2. Plaintiffs Harry P. Locklin and Elmer J. Brant are general partners doing business under the firm name of Radiant Color Company and they both are residents and citizens of the State of California.

3. Defendant Switzer Brothers, Inc. is a corporation of the State of Ohio, and, for the purposes of this Action, has admitted that it is doing business in this judicial district.

4. Jurisdiction of this Court to try the issues here involved is not contested and venue is admitted.

5. Defendant charges that Plaintiffs have infringed product claims 1 to 4, inclusive, and method claim 9 of the Kazenas patent in suit by the manufacture and sale of fluorescent pigments under the trademark "Velva-Glo".

6. The Court adopts its Memorandum of Court filed September 4, 1959, as further Findings of Fact.

CONCLUSIONS OF LAW

The Court concludes as a matter of law that:

1. Defendant is the owner of Kazenas patent 2,809,954;

2. That said Letters Patent and claims 1, 2, 3, 4 and 9 thereof are valid.

3. That the Plaintiffs have infringed said claims 1, 2, 3, 4 and 9 by their manufacture, use, sale and offer for sale of Plaintiffs' "Velva-Glo" fluorescent pigments, and Plaintiffs have infringed upon claim 9 of said Kazenas patent by their practice of the method covered thereby in the manufacture of such fluorescent pigments.

The Complaint is hereby dismissed and the relief prayed for in the Counterclaim is granted, except as to attorneys' fees.

Judgment in accordance with the foregoing Findings of Fact and Conclusions of Law will be entered.

Dated November 17, 1959

Goodman, J.,
United States District Judge

In the United States District Court
Northern District of California
Southern Division

Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, Plaintiffs, vs. Switzer Brothers, Inc., a corporation, Defendant.	Civil Action No. 36995 (Suit for Declarato Judgment Based Letters Patent N 2,809,954)

JUDGMENT

[Filed Nov. 17, 1959]

This cause came on to be heard on the pleadings and evidence introduced and filed in open Court, and on the briefs of counsel, and the Court being fully advised in the premises, and upon trial of said cause in open Court, and full consideration of the testimony given on oral hearing, pleadings, admissions, demonstrations, exhibits and motions made in this cause, and the Court having made its Findings of Fact and Conclusions of Law, and the Court having found that Plaintiffs have not sustained their burden of proof, and that Defendant has sustained its burden of proof and Defendant is entitled to the relief prayed for in its Counterclaim;

Wherefore, it is hereby ordered, adjudged and decreed as follows:

1. That this Court has jurisdiction of the parties and the subject matter; this Court is a proper venue; and all objections thereto have been waived by the parties.

2. That United States Letters Patent No. 2,809,954 was duly and legally issued to Zenon Kazenas, assignor, and by mesne assignments to Switzer Brothers, Inc., Defendant herein, for Thermoplastic Melamine-Sulfonamide-Formaldehyde Resinous Materials and Process for Making Same, and since that date this Defendant has been and still is the owner of said Letters Patent.

3. That said Zenon Kazenas is the first and true inventor of the inventions described and claimed in said Letters Patent.

4. That claims 1 to 4, inclusive, and 9 of said Letters Patent are good and valid in law.

5. That Plaintiffs, Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, jointly and/or severally, have infringed upon claims 1 to 4, inclusive, of said United States Letters Patent No. 2,809,954 by their manufacture, use, sale and offer to sell of Plaintiffs' "Velva-Glo" fluorescent pigments, and have infringed upon claim 9 of said Letters Patent by their practice of the method covered thereby in the manufacture of said fluorescent pigments.

6. That the Complaint of Plaintiffs has not been sustained and is hereby dismissed.

7. That Defendant shall recover from Plaintiffs, or either of them, damages adequate to compensate Defendant for Plaintiffs' joint and/or several manufacture, use, sale and/or offer for sale of fluorescent pigments in violation and infringement of claims 1 to 4, inclusive, and 9 of

said United States Letters Patent No. 2,809,954, and in no event less than a reasonable royalty for the use made by Plaintiffs, jointly and/or severally, of the inventions of said Letters Patent, together with interest thereon and Defendant shall have judgment and execution against said Plaintiffs, jointly and severally, therefor.

8. That Defendant shall recover from the Plaintiffs costs of the Defendant in this suit and that Defendant shall have judgment and execution against said Plaintiffs, jointly and severally, for said costs.

9. That this Court retains jurisdiction hereof and shall hereafter set this matter down for hearing as to the amount of said damages.

10. That a perpetual injunction issue out of and under the Seal of this Court, directed to the Plaintiffs, Harry P. Locklin and Elmer J. Brant, jointly and severally, and all those controlled by them or either of them or in privity with them or either of them, restraining and enjoining them and each of them, and they and each of them be and are hereby permanently enjoined and restrained from directly or indirectly making, using, selling or offering for sale, except under license from Defendant, any fluorescent pigment embodying or manufactured by the use of the inventions disclosed and claimed in claims 1, 2, 3, 4 and/or 9 of said United States Letters Patent No. 2,809,954, or in any other way infringing upon said claims.

/s/ Goodman
United States District Judge

Enter:
Nov. 17, 1959.

United States Court of Appeals
for the Ninth Circuit

Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, Appellants, vs. Switzer Brothers, Inc., a corporation, Appellee.	No. 16,780 Nov. 16, 1961

Upon Appeal from the United States District Court
for the Northern District of California
Southern Division

Before: Barnes, Jertberg and Merrill, Circuit Judges

Merrill, Circuit Judge:

Appellants, doing business in California as Radiant Color Company, are manufacturers of fluorescent paints. They have taken this appeal from a judgment determining that they have infringed a patent held by appellee. The parties hereafter shall be referred to as "Radiant" (appellants) and "Switzer" (appellee).

Suit was originally brought by Radiant. It had been notified by Switzer that certain of its pigments infringed Switzer's resin patent number 2,809,954. This action was brought seeking declaratory relief: a determination that the patent in question was invalid and was not infringed. Switzer counterclaimed, charging Radiant with infringe-

ment and seeking injunctive relief. The district court ruled that the patent was valid and infringed and granted Switzer relief in accordance with these determinations.

The patent in question was issued October 15, 1957, to Zenon Kazenas and subsequently was assigned to Switzer. It is for a resin useful in the manufacture of pigments and for the process of obtaining that resin. A preliminary consideration of the characteristics and chemical components of such resins is essential to any discussion of the issues presented by this appeal.

Such resins are classified industrially as "thermosetting" and "thermoplastic." A thermosetting resin is one which, upon heating in a mold, hardens to form an infusible "thermoset" resin that no longer can be softened or fused by heating. A thermoplastic resin, in contrast, can be softened or fused by heat repeatedly.

For resins satisfactorily to be incorporated into pigments, certain characteristics are important. The resin must be capable of being finely ground. Once ground, it must remain insoluble in common paint vehicles or solvents and in a state of free flowing suspension.

Thermosetting resins, being tough and hornlike, are generally difficult to grind. Thermoplastic resins generally are also difficult to grind due to their tendency to ball up or "agglomerate" at the temperatures encountered during grinding. Furthermore, they generally do not remain in a free flowing state of suspension in common paint vehicles, but again tend to agglomerate.

We are here concerned with three chemical components: melamines, sulfonamides and aldehydes. These compo-

nents and their characteristics were discussed in some detail by Dr. David B. Hatcher, an expert witness called by Switzer.

Melamine and sulfonamide are basic resin ingredients. Aldehyde was described as "the linker, you might call it the glue, between the larger molecules" of melamine or sulfonamide. Where melamine alone is reacted with an aldehyde, the result is a "self-condensed" resin, the molecules of melamine condensing with each other through reaction with the aldehyde. Similarly, a sulfonamide-aldehyde resin is a self-condensation. "Co-condensation" occurs where two unlike molecules are reacted together.

Dr. Hatcher testified, "Normally, melamine is resistant to co-condensation. It has a tendency to condense with itself so that most efforts to co-condense it are unsuccessful. What results is not a single resin resulting from co-condensation * * * but a mixture of self-condensed resins." Further, melamine resins are normally thermoset with considerable strength and resistance to crumbling and breaking.

Sulfonamide resins, on the other hand, are normally thermoplastic and soluble in aromatic solvents.

The Kazenas patent is for a resin which is a co-condensation of all three of these chemical components and which is thermoplastic but still is capable of being finely ground and which remains insoluble without agglomeration in aromatic hydrocarbon solvents.[1]

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[1]Radiant was found to have infringed Claims 1, 2, 3, 4 and 9 of the Kazenas patent. Claim 2 is typical. It provides:

"A completely condensed, thermoplastic resin consisting essentially of the condensation product of at least one aldehyde

Upon this appeal Radiant attacks the validity of the Kazenas patent upon five separate grounds.

The first issue is presented by Radiant's contention that the Kazenas patent is lacking in patentable novelty. The prior art upon which Radiant mainly relies is a Japanese patent, the Matsuo and Nitta Patent No. 181,405, issued in 1950. This patent, Radiant asserts, discloses a thermoplastic resin made by co-condensing formaldehyde, sulfonamide and melamine.

The district court carefully considered the Japanese patent and, apparently relying on the testimony of Dr. Hatcher with respect to his experiments upon this patent, concluded:

> "The Japanese resin, as described in the patent, thus has properties similar to those of the Kazenas resin in that it is thermoplastic and has a relatively high melting point, but it differs in at least one vital respect in that it is soluble in aromatic hydrocarbons, while the Kazenas resin is substantially insoluble."

The court then pointed out:

> "Both the Japanese resin and the Kazenas resin are composed of a sulfonamide, an aldehyde, and mela-

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component entirely selected from the class consisting of formaldehyde and paraformaldehyde, at least one aromatic monosulfonamide having two reactive amide hydrogens, where the sulfonamide group is attached directly to the aromatic nucleus through the sulfur atom, and at least one melamine compound selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, the amount of said melamine compound being an amount, not exceeding 50% by weight of the armotic monosulfonamide, sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting."

mine, but in critically different proportions. The most significant difference is in the amount of melamine. The Japanese patent specified a 'small' amount of melamine which, in the single example set forth in the patent, is 5% by weight of the para-toluol-sulfamide employed. The Kazenas patent teaches the use of a substantial amount of melamine or melamine derivative ranging in amount from 11 to 50% by weight of the sulfonamide. Kazenas also teaches the use of a greater amount of aldehyde in relation to the sulfonamide."

Radiant contends that a mere varying in proportions cannot constitute novelty and invention and that this is all that the Kazenas patent adds to the Japanese patent.

The general rule as stated in Smith vs. Nichols, 1874, 21 Wall. (88 U.S.) 112, 119, is:

"* * * a mere carrying forward of new or more extended application of the original thought, a change only in form, proportions, or degree, the substitution of equivalents, doing substantially the same thing in the same way by substantially the same means with better results, is not such invention as will sustain a patent."

In Greene Process Metal Company vs. Washington Iron Works, 9 Cir., 1936, 84 F.2d 892, 893, this court held unpatentable a discovery described as follows:

"Greene's alleged discovery was that the desired result—removal of sulfur and other impurities from iron or steel— might be accomplished more effectively and more economically by increasing the percentage of silica in the slag used for that purpose. * * *"

The test would seem to be whether the varying of proportions brings about a mere improvement in the already

discovered result or, on the other hand, accomplishes a new and unexpected result. In Application of Aller, Court of Customs and Patent Appeals, 1955, 220 F.2d 454, 456, it is stated:

> "Normally, it is to be expected that a change in temperature or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art. * * * Such ranges are termed 'critical' ranges, and the applicant has the burden of proving such criticality. * * * However, even though applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art. * * * More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. * * *"

With reference to Radiant's contention that the Kazenas patent lacked invention, the district court stated:

> "Plaintiffs urge that it did not constitute invention for Kazenas to vary the proportion of melamine and aldehyde to achieve substantial insolubility in aromatic hydrocarbons. But the Japanese patent itself does not even suggest the possibility that a greater proportion of melamine and aldehyde might produce a resin substantially insoluble in aromatic hydrocarbons. Indeed, it would discourage experimentation along these lines. Since the patent states that, except for greater waterproofness and a higher melting

point, the Japanese resin does not lose the characteristics of a conventional para-toluol-sulfamide resin, one could only conclude that the modification with melamine does not affect its solubility in aromatic hydrocarbons.

"It is possible that the mere fact that melamine-aldehyde resins were known to be insoluble in aromatic hydrocarbons might suggest to a skilled chemist that the modification of a sulfonamide-aldehyde resin with melamine might make the resin less soluble in aromatic hydrocarbons. But, it could not have been anticipated that sufficient melamine could be used to achieve substantial insolubility in aromatic hydrocarbons without simultaneously making the resin thermosetting."

The testimony of Dr. Hatcher provides clear support. Emphasizing the overpowering nature of melamine and its tendency to thermoset, he concluded that the Japanese patent would not have led the ordinary chemist to greater experimentation in increasing the proportions of melamine. He discussed the many classes of melamine and sulfonamide compounds. He pointed out that a chemist faced with this multitude of possible components and with the economics of industrial research would actually be discouraged from experimentation along these lines and would tend to accept the original discouraging premise that an increase in melamine would result in thermosetting.

The district court's conclusion upon this issue, with which we agree and which we here adopt, was as follows:

"The sum and substance of the teachings of the prior art, including the Japanese patent, was that the

properties of melamine-aldehyde resin could be modified to some extent by adding a small amount of a sulfonamide, and that the properties of a sulfonamide-aldehyde resin could be modified by adding a small amount of melamine. These teachings were narrow ones. They did not constitute such important and substantial discoveries that the ordinarily capable chemist could carry on from that point and in normal course produce the Kazenas resin. The Kazenas patent discloses the new and broader concept that melamine and sulfonamide, each in a relatively substantial quantity, could be reacted together with an aldehyde to produce a distinct resin having some of the properties of a sulfonamide-aldehyde resin and some of the properties of a melamine-aldehyde resin, and other properties which are unique. The Kazenas resin represented a new arrangement of ingredients that produced a new, unexpected and useful result. The Court is satisfied that it was such an advance over the prior art as to constitute invention."

Radiant's second attack upon the validity of the patent is addressed to the fact that the limits of melamine are expressed in functional language. The claims provide (see footnote 1) that the amount of melamine shall be "an amount * * * sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting."

Since the novelty for which Switzer contends is that this resin is both thermoplastic and insoluble, Radiant contends that this language violates the rule against the use of functional language at the precise point of novelty. Violation of this rule, Radiant contends, renders the patent invalid.

Many authorities are cited by Radiant in support of its position. As disclosed by these cases, the vice of a description in terms of function is that it may in either of two ways adversely affect the public interest: by broadening the claim beyond the scope of actual invention; or by rendering the description so vague that the actual scope of the patent is not made clearly apparent to those concerned.

General Electric Company vs. Wabash Company, 1937, 304 U.S. 364, dealt with a patent upon a light filament which attacked the problem encountered by prior art that such filaments had a tendency toward "sagging and offsetting" which reduced the life of the light bulb. The claim prescribed that the filaments should consist of grains "of such size and contour as to prevent substantial sagging and offsetting" during a commercially useful life for the bulb. The court stated at page 371:

> "The claim uses indeterminate adjectives which describe the function of the grains to the exclusion of any structural definition, and thus falls within the condemnation of the doctrine that a patentee may not broaden his product claims by describing the product in terms of function. Claim 25 vividly illustrates the vice of a description in terms of function. 'As a description of the invention is insufficient and if allowed would extend the monopoly beyond the invention.'"

Further, the court stated at page 372:

> "The Circuit Court of Appeals below suggested that 'in view of the difficulty, if not impossibility, of describing adequately a number of microscopic and heterogeneous shapes of crystals, it may be that Pacz made the best disclosure possible, * * *.' But Congress

requires, for the protection of the public that the inventor set out a definite limitation of his patent; that condition must be satisfied before the monopoly is granted."

In our case Switzer, in justification of the functional language, points out that the alternative would have been to state the critical lower limits precisely. This was done in the examples set forth in the specification. Switzer points to the fact that of the considerable number of melamine compounds encompassed by the patent, each has a different critical limit. It asserts that this renders it wholly unreasonable to expect the claims to be specific in this respect or to expect any further specificity than that which appears in the examples given.

In the General Electric case, the effect of the functional language was to broaden the claim to include *all* grains of whatever size or shape so long as they would accomplish the desired result. In our case the critical area is not enlarged in such a fashion. The critical point remains the same for each melamine compound used. It simply is not specified. But whether specified or unspecified the scope of the claim is precisely that of the invention.

Nor can it be said that this failure to specify the critical limit precisely results in a fatal vagueness of description. The claim must be sufficiently clear to allow others to reproduce the result at the end of the monopoly period and to enable contemporary inventors to ascertain whether or not they are infringing.

Upon this point the district court concluded:

"When the general description, the specific examples, and the claims are read together, the invention is so

plainly defined that no one skilled in the art should have any difficulty in practicing it."

The record supports this statement. There is testimony to the effect that "sufficient melamine to render the resin substantially insoluble" is a simple, clear test for an ordinary chemist to perform and one which does not require extensive experimentation in order that the precise critical limits be ascertained in a particular case. Under such circumstances, the fact that some preliminary testing is required does not render the claim invalid for vagueness. Mineral Separation, Limited vs. Hyde, 1916, 242 U.S. 261.

We conclude that the fact that the limits of melamine are, in the claims, stated in functional language does not render the patent invalid.

Radiant's third attack upon the validity of the patent is addressed to the sufficiency of the description contained in the specification. Radiant contends that it does not meet the requirements of 35 U.S.C. § 112 that there be "a written description" which must be in "full, clear, concise and exact terms" directed to "any person skilled in the art."

Radiant first asserts that the specification, as distinguished from the claims, does not describe the insolubility of the product. In our view, the specification when read as a whole does sufficiently describe this feature.

Radiant contends that the record establishes that one skilled in the art could not reproduce the product from the description. It appears that the district court dis-

counted the testimony upon which Radiant relies and favored the contrary testimony of Dr. Hatcher.

Radiant protests that Dr. Hatcher was not an ordinary chemist but an expert and that his ability to reproduce was not the proper test.

The ability of "any person skilled in the art" to reproduce the product was a question for the trier of fact. It was for the district court to determine whether the steps followed by Dr. Hatcher were of a type which required an expert as distinguished from an ordinary industrial chemist. We cannot say that the court's findings in this area were clearly erroneous.

We conclude that Radiant's contentions in this respect are without merit.

Radiant next contends that the Kazenas claims, as Switzer here asserts them, are invalid because they were not, in their present form, included in the original application. The feature to which this contention is specifically addressed is the resin's insolubility in aromatic solvents.

The original application was filed January 26, 1954. The claims did not then provide that the amount of melamine was required to be sufficient to render the resin substantially insoluble in aromatic hydrocarbon solvents. Early in 1954 Switzer adopted the Kazenas resin commercially. In 1956 Switzer learned that two competitors planned to introduce competitive products and, informing the Patent Office of this fact, sought to expedite issuance of patent. Following interviews in the Patent Office, the amended claims upon which the patent ultimately was issued were presented May 2, 1957. They were unaccompanied by the

oath of Kazenas and, Radiant contends, were presented after the public use period had expired and intervening rights of the public had accrued. Radiant contends that under these circumstances the feature of insolubility cannot be relied upon to impart novelty.

The defense of intervening rights for which Radiant contends has developed in cases dealing with reissue and divisional patents. It is apparently aimed at protecting the public against enlargement of the original claim to encompass discoveries by others and also at achieving an equitable balance between the right of the inventor to an adequate claim of that which he has invented and the public right to reliance upon the inventor's apparent disclaimer of such invention as is not claimed.

In the area of amendment prior to patent issuance a further consideration is the public interest in an adequate disclosure by the patentee of that which is sold to the public. In Muncie Gear Company vs. Outboard Company, 1942, 315 U.S. 759, 768, it was held, "The claims in question are invalid if there was public use, or sale, of the device which they are claimed to cover, more than two years before the first disclosure thereof to the Patent Office." In Wire Tie Machine Company vs. Pacific Box Corporation, Ltd., 9 Cir., 1939, 102 F.2d 543, this court held the rule inapplicable in a case where the amendment complained of added narrower claims and not new matter and further held that such amendment needed no supplemental oath.

Here the feature of insolubility was disclosed in the specifications of the original application, although its bearing upon the critical limit in the amount of melamine

was not expressed. We are not then faced with a claim of new matter nor with an attempt to rectify an inadequate disclosure or to appropriate subsequent developments or discoveries. The amendment actually amounted to no more than a narrowing of the claims to articulate a limitation implicit in the specifications but not explicit in the claims themselves. The circumstances under which the amendment was filed would indicate that it resulted from the ordinary give and take of Patent Office procedures: the shaping of the expression of that which was sought in order to make it conform appropriately to that which it was felt could properly be granted.

We conclude under these circumstances that no intervening public rights can be said to have attached in the insolubility feature of the Kazenas patent or to the matters incorporated in the claims by amendment; that no supplemental oath was required.

Finally Radiant contends that the specification of the patent is inadequate to support a claim for a broad class of melamine derivatives. It is asserted that "there is no recipe given for the proportions of the entire class of melamine compounds by which one could be certain to obtain the critical result." It is pointed out that all that Kazenas did was to give recipes for two members of the class. Radiant concludes that Kazenas thus "asked the art to experiment with other members of the class to obtain the result which he desires." Stating its proposition in somewhat different language, Radiant contends that the patent must disclose that all members of the broad melamine class are effective to produce the alleged novel result.

The cases cited by Radiant have their root in The Incandescent Lamp Patent, 1895, 159 U.S. 465, where at page 472 the court stated:

> "Is the complainant entitled to a monopoly of all fibrous and textile materials for incandescent conductors? If the patentees had discovered in fibrous and textile substances a quality common to them all, or to them generally, as distinguishing them from other materials, such as minerals, etc., and such quality or characteristic adapted them peculiarly to incandescent conductors, such claim might not be too broad. If, for instance, minerals or porcelains had always been used for a particular purpose, and a person should take out a patent for a similar article of wood, and woods generally were adapted to that purpose, the claim might not be too broad, though defendant used wood of a different kind from that of the patentee. But if woods generally were not adapted to the purpose, and yet the patentee had discovered a wood possessing certain qualities, which gave it a peculiar fitness for such purpose, it would not constitute an infringement for another to discover and use a different kind of wood which was found to contain similar or superior qualities. The present case is an apt illustration of this principle. Sawyer and Man supposed they had discovered in carbonized paper the best material for an incandescent conductor. Instead of confining themselves to carbonized paper, as they might properly have done, and in fact did in their third claim, they made a broad claim for every fibrous or textile material, when in fact an examination of over six thousand vegetable growths showed that none of them possessed the peculiar qualities that fitted them for that purpose. Was everybody then precluded by this broad claim from making further investigation? We think not."

In the instant case there is nothing in the record to suggest that the qualities discovered by Kazenas were not common to melamine and to such of its derivatives as were specified in the claims, the only difference being in the critical limit in the amount of the component used. As we have already pointed out, there is evidence that the ascertainment of these specific limits in any particular case did not require extensive or undue experimentation. With respect to Radiant's contention that Switzer must establish the effectiveness of each member of the broad class, the district court stated:

> "Plaintiffs have cited no authority and the court is aware of none that places such a burden on the defender of a patent."

We agree.

In our judgment this contention is without merit.

We conclude that in all aspects challenged by Radiant, the Kazenas patent is valid.

Radiant next contends that it has not infringed the Kazenas patent. In this respect it looks not to the claims (which we have already held to be valid) but to the examples set forth in the specifications. It asserts that it uses more melamine (27.6% or 36.9%) than was used in the examples (13%); that it uses too little formaldehyde; that its process is different from that shown in the examples.

The amounts of melamine used by Radiant are well within the upper limit (50%) set by the claims. While the claims do not specify the amount of aldehyde, it is clear

that it is such an amount as will permit complete co-condensation.

Radiant asserts that its proportions are closer to those of the Japanese patent than to those of the Kazenas patent and that it should accordingly be regarded as protected by prior art. Radiant concedes, however, that the Japanese patent is not adequate to meet its needs. What it requires is that which the Kazenas resin provides: completeness of co-condensation and insolubility in aromatic solvents.

In our judgment then, the district court was not in error in concluding that Radiant's resins infringed the Kazenas patent.

In several respects in post-trial proceedings (the settlement of findings, motions for new trial and to vacate judgment) Radiant attempted to introduce new matters of evidence. It offered proof of other patents to establish lack of invention. It offered testimony of Kazenas in another unrelated proceeding assertedly inconsistent with Switzer's position in the instant case. It offered testimony relating to post-decision tests run by it. It invited a second look at physical evidence which had been offered at trial to demonstrate the free flowing and insoluble character of the Kazenas resin, asserting that such second look would demonstrate that since trial the resin had agglomerated.

All of this evidence was rejected by the district court for failure of Radiant to show diligence or justification for its failure to discover and present these matters at the time of trial. Radiant assigns error in this respect but we find no abuse of discretion in this ruling. The time for

testing of proof is the time of trial. Our judicial system does not contemplate that the rights of litigants shall be held in abeyance for months or years in order that hindsight may provide a more accurate appraisal of evidence.

Radiant protests that the post-trial change in physical evidence should not be subject to the requirement of diligence. If the fact was that the resin would agglomerate and would not remain free flowing, Radiant could have established this by its own pre-trial experiments and have introduced evidence with respect to those experiments at the proper time. Post-trial experimenting with the evidence produced at trial is no substitute for the proper and orderly presentation of proof. Furthermore, there is no evidence as to the conditions to which this exhibit had been subjected following trial and thus a proper foundation was not laid for the admissibility of this offered proof.

Radiant protests that a showing of diligence is not necessary where the proof offered shows a lack of clean hands on the part of the patentee; that it had offered proof of deception practiced by Kazenas and Switzer both on the Patent Office and on the district court. It contends that in the public interest, where the question of deception or unclean hands is at issue, the question can be raised at any time. Hazel-Atlas Glass Company vs. Hartford-Empire Company, 1944, 322 U.S. 238, is cited where the court at page 246 states:

> "This matter does not concern only private parties. There are issues of great moment to the public in a patent suit. * * * Furthermore, tampering with the administration of justice in the manner indisputably

shown here involves far more than an injury to a single litigant. It is a wrong against the institutions set up to protect and safeguard the public, institutions in which fraud cannot complacently be tolerated consistently with the good order of society. Surely it cannot be that preservation of the integrity of the judicial process must always wait upon the diligence of litigants. The public welfare demands that the agencies of public justice be not so impotent that they must always be mute and helpless victims of deception and fraud."

However, it should be obvious that every disgruntled litigant cannot, in the name of public welfare, secure a new trial simply by charging fraud. In Hazel-Atlas the Supreme Court recognized this, stating at page 248:

"The petition must contain the necessary averments, supported by affidavits or other acceptable evidence; and the * * * court may in the exercise of a proper discretion reject the petition * * *."

In Hazel-Atlas the proof of fraud was clear. Not so in the instant case. Here the district court, after listening at great length to the contentions of Radiant's counsel respecting its proof of deception, stated:

"* * * I don't see any aspect of fraud or misrepresentation or chicanery involved in the application for the patent in this case * * *."

and later:

"I abhor fraud and misrepresentation and I never have any hesitancy in turning aside any decision or in granting relief in cases of that kind. But I don't discern in this case anything of that sort."

We have examined the matters charged by Radiant and the offered proofs and concur in the views of the district court. It was not then an abuse of discretion for the district court (bearing in mind both lack of diligence and the showing made with respect to fraud and the public welfare) to deny a new trial upon the ground of unclean hands or to refuse to delay judgment in order that hearing might he had on the newly tendered issues.

Affirmed.

(Endorsed) Opinion Filed Nov. 16, 1961.

Frank H. Schmid, Clerk.

United States Court of Appeals
for the Ninth Circuit

Harry P. Locklin, et al., Appellants, vs. Switzer Brothers, Appellee.	No. 16780

JUDGMENT

Appeal from the United States District Court for the Northern District of California, Southern Division.

This Cause came on to be heard on the Transcript of the Record from the United States District Court for the Northern District of California, Southern Division, and was duly submitted.

On Consideration Whereof, It is now here ordered and adjudged by this Court, that the judgment of the said District Court in this Cause be, and hereby is affirmed with costs in favor of the appellee and against the appellants. It is further ordered and adjudged by this court that the appellee recover against the appellants for its costs herein expended and have execution therefor.

Filed and entered November 16, 1961

In the United States District Court
Northern District of California
Southern Division

Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, Plaintiffs, vs. Switzer Brothers, Inc., a corporation, Defendant.	No. 36995

MEMORANDUM OF DECISION

[Filed March 31, 1964]

Sweigert, J.

Switzer Brothers, Inc., a corporation (Switzer), moves the Court for an order adjudging Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company (Radiant), to be in civil contempt of this Court for violation of the Judgment entered by the Court on November 17, 1959, affirmed on appeal on November 16, 1961 (Locklin v. Switzer Brothers, Inc., 299 F. 2d 160 (9th Cir. 1961)) and for violation of the Writ of Perpetual Injunction issued by the Court on May 2, 1962.

Said injunction restrained respondents "from directly or indirectly making, using, selling or offering for sale,

except under license from Switzer Brothers, Inc., any fluorescent pigment embodying or manufactured by the use of the inventions disclosed and claimed in Claims 1, 2, 3, 4 and/or 9 of said United States Letters Patent No. 2,809,954, or in any other way infringing upon said claims * * *."

The Court in its discretion may determine the issue of infringement in a contempt proceeding. Whether Switzer is entitled to relief depends upon whether the Court's injunction has been violated. However, if the difference between the device adjudicated to infringe in the prior action and the newly accused device is substantial or doubtful, not merely colorable, the patent-holder will be denied relief and relegated to his other remedies, such as an independent action for infringement. *Baltz v. The Fair,* 279 F. 2d 899 (7th Cir. 1960); *Hartford-Empire Co. v. Obear-Nester Glass Co.,* 95 F. 2d 414 (8th Cir. 1938); *Holmes v. Atlas Garage Door Co.,* 63 F. Supp. 692 (S. D. Calif. 1945).

Pursuant to a Court order dated May 22, 1963, both parties have filed affidavits, which the Court has examined in full, setting forth all the factual matters upon which they rely. In addition, the Court has examined the record of the prior action.

The following factual background is paraphrased from the opinion of the Court of Appeals (Locklin v. Switzer, supra at 162):

The patent in question was issued October 15, 1957, to Zenon Kazenas and subsequently was assigned to Switzer.

It is for a resin useful in the manufacture of pigments and for the process of obtaining that resin.

Resins are classified industrially as "thermosetting" or "thermoplastic." A thermosetting resin is one which, upon heating in a mold, hardens to form an infusible "thermoset" resin that no longer can be softened or fused by heating. A thermoplastic resin, in contrast, can be softened or fused by heat repeatedly.

For resins satisfactorily to be incorporated into pigments, certain characteristics are important. The resin must be capable of being finely ground. Once ground, it must remain insoluble in common paint solvents and in a state of free flowing suspension.

Thermoplastic resins generally are difficult to grind due to their tendency to ball up or "agglomerate" at the temperatures encountered during grinding. Thermoplastic resins also do not generally remain in a free flowing state of suspension in common paint solvents, but again tend to agglomerate.

The Kazenas patent is for a resin containing three chemical components: melamine, sulfonamide and an aldehyde. Melamine and sulfonamide are basic resin ingredients. Aldehyde is "the linker" or "the glue" between the larger molecules of melamine or sulfonamide.

Where melamine alone is reacted with an aldehyde, the result is a "self-condensed" resin, the molecules of melamine condensing with each other through a reaction with the aldehyde. Similarly, a sulfonamide-aldehyde resin is a self-condensation. "Co-condensation" occurs where two

unlike molecules are reacted together. In a complete co-condensation there are no unreacted ingredients.

Normally, melamine is resistant to co-condensation. It has a tendency to condense with itself, resulting in a mixture of self-condensed resins.

Furthermore, melamine resins are normally thermoset with considerable resistance to crumbling.

Sulfonamide resins, on the other hand, are normally thermoplastic and soluble in aromatic solvents.

The Kazenas patent is for a resin which is a co-condensation of melamine, sulfonamide and an aldehyde and which is thermoplastic but which still is capable of being finely ground and which remains insoluble without agglomeration in aromatic hydrocarbon solvents.

In the prior litigation, the Kazenas patent was found to be valid and infringed by Radiant as to Claims 1, 2, 3, 4 and 9. The issue presently before the Court is whether Radiant's new product, the 4-C resin, also infringes the Kazenas patent.

Radiant concedes that the only distinction between its prior R-104 resin, which has been adjudicated to infringe the Kazenas patent, and Radiant's new 4-C resin in their chemical composition is the addition of a small amount (less than 3% by weight) of urea. However, Radiant contends that the presence of urea results in a product which has substantially different chemical and physical properties than either the R-104 resin or the Kazenas resin.

Radiant has filed affidavits to the effect that in the new 4-C resin urea is present in a significant amount in terms

of molecular percentage and that it enters into a reaction with the other chemical components. Radiant's affidavits have established that the 4-C and the R-104 vary in their reaction to the application of heat. Radiant has also filed affidavits to show the different commercial utility of the 4-C resin, e.g., that the 4-C resin is unsuitable, while the R-104 is commercially acceptable for use in the manufacture of plastic articles by the usual injection or extrusion molding techniques wherein temperatures in the range of 450-500 ° F. are commonly encountered, or that the 4-C resin is suitable for use in the manufacture of flexographic or steam set inks, while the R-104 is not.

However, the presence of urea resulting in minor differences in properties and commercial end use of the 4-C resin would be without significance if the 4-C resin falls clearly within the claim of the Kazenas patent. *Graver Mfg. Co. v. Linde Co.*, 339 U.S. 605, 607 (1949). An accused device cannot escape infringement merely by adding features or making improvements if it otherwise adopts the basic features of the patent. *Neff Instrument Corp. v. Cohu Electronics Inc.*, 298 F. 2d 82, 89-90 (9th Cir. 1961); *Aluminum Company of America v. Sperry Products, Inc.*, 285 F. 2d 923, 924 (6th Cir. 1960).

It is to the claims of the patent to which the Court must first look to determine whether there is an infringement. The claims of the patent measure the invention and define precisely what the invention is, and the limits beyond which lies infringement. 3 *Walker, Patents* 1681 (Deller ed. 1937), cited in *Neff Instrument Corp. v. Cohu Electronics Inc.*, supra at 88.

Claim 2 of the Kazenas patent is typical. It provides for "A completely condensed, thermoplastic resin consisting essentially of the condensation product of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde, at least one aromatic monosulfonamide having two reactive amide hydrogens, where the sulfonamide group is attached directly to the aromatic nucleus through the sulfur atom, and at least one melamine compound selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, the amount of said melamine compound being an amount, not exceeding 50% by weight of the aromatic monosulfonamide, sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting."

Putting aside for the moment the question whether the new 4-C resin is completely condensed, the record does not disclose any factual dispute concerning the nearly identical relationship of the 4-C resin to the Kazenas claim. Radiant uses aldehyde, sulfonamide and melamine, the melamine being 18.45% by weight of the sulfonamide. The 4-C resins are thermoplastic. The three chemicals are present in the 4-C resin in proportions sufficient to render the condensation product substantially insoluble in aromatic hydrocarbons but insufficient to render it thermosetting. Radiant admits that the 4-C resin is, in fact, substantially insoluble in aromatic hydrocarbons.

However, Radiant does contend that the 4-C resin is not completely condensed because of the presence, after testing, of an amount of unreacted formaldehyde. See Affidavit of Weiner, filed August 19, 1963. However, this affidavit is contradicted by Radiant's own Answers to Switzer's Request for Admissions, filed June 11, 1963. The test performed by Dr. Weiner did not conform, as it purported to do, to the test performed by Dr. Hatcher at the first trial. See Affidavit of Hatcher, p. 13, filed September 15, 1958.

Furthermore, Dr. Hatcher stated in his affidavit that in order to produce a completely condensed thermoplastic resin consisting of sulfonamide, formaldehyde and melamine, it is necessary to use equimolar amounts of sulfonamide and formaldehyde plus an additional amount of formaldehyde that is more than equimolar to the amount of melamine used. The 4-C resin contains equimolar amounts of sulfonamide and formaldehyde (four and four) plus three mols of formaldehyde for one mol of melamine, and thus fulfills this requirement for complete condensation.

Radiant's position is that complete condensation is necessary in order for the Kazenas resin to be substantially insoluble in aromatic hydrocarbons; that the 4-C resins are not completely co-condensed, yet are substantially insoluble in aromatic hydrocarbons; and that, therefore, the presence of urea alone is responsible for the substantial insolubility of the 4-C resin in aromatic hydrocarbons. In support of this contention, Radiant has attempted to show that urea-containing resins have a

greater insolubility characteristic than urea-free resins. See Affidavits of Bennahmias.

However, the logical inference of the Court is that the substantial insolubility of the 4-C resin in aromatic hydrocarbons is due to the teachings of the Kazenas patent, i.e., the presence in the 4-C formula of sufficient proportions of sulfonamide, formaldehyde and melamine to produce co-condensation. See also the statement in the Affidavit of Huber, p. 9, filed on behalf of Radiant August 19, 1963, that, "Your affiant knows of no data or analogues in the technical literature which would indicate that insolubility and redispersability in aromatic hydrocarbon solvents, brought about by virtue of 'complete co-condensation,' can also be brought about by using urea as a fourth component in an incompletely co-condensed resin or pigment."

Thus, the Court concludes that notwithstanding the conclusions expressed in the affidavits filed on behalf of Radiant, the facts set out in all the affidavits on file conclusively establish that the 4-C resin is completely co-condensed according to the claim of the Kazenas patent.

Radiant further contends that in order to overcome the prior art Thompson patent, which taught the use of four components, including melamine and urea, Switzer had to expressly limit itself to a three component system in order to receive its patent by inserting as a limitation the language "consisting essentially of."

However, the record discloses that Switzer distinguished the Thompson patent, not on the basis of the number of components, but on the basis that the Thompson patent

uses a dicarbonyl compound where the Kazenas patent uses formaldehyde, a monocarbonyl compound, and on the basis that the Kazenas patent regulates the amount of melamine in order to produce a thermoplastic, instead of a thermosetting resin.

Furthermore, as noted by the Court in the first trial, the sum and substance of the prior art teachings was merely that the properties of a melamine-aldehyde resin could be modified to some extent by adding a small amount of a sulfonamide, and that the properties of a sulfonamide-aldehyde resin could be modified by adding a small amount of melamine. However, the Kazenas patent taught that substantial quantities of melamine and sulfonamide could be reacted together with an aldehyde to produce a distinct resin with unique properties. *Locklin v. Switzer Brothers Inc.*, supra at 164-65.

The record thus supports the language of the claim, which calls for a resin "consisting *essentially* of" aldehyde, sulfonamide and melamine (emphasis added). We construe "essentially" to refer to the quality of belonging to the very nature or essence of a thing and, therefore, incapable of removal without destroying the thing itself. *Webster's New Collegiate Dictionary* (1961 ed.). Such a construction is in accord not only with normal usage but with the history of the patent.

The fact that the 4-C resin contains a small amount of urea, which is not essential to produce the desired characteristics of the resin, namely thermoplasticity, co-condensation and insolubility in aromatic hydrocarbons, is not sufficient for Radiant to escape the coverage of the Kazenas claim.

Radiant further contends that Switzer cannot extend the Kazenas claim to cover the 4-C formula because the Kazenas claim is limited by the Markush expression, "at least one melamine compound selected from the class consisting of melamine * * *," and because the urea in the 4-C formula is not a legal equivalent of melamine.

However, Radiant mischaracterizes Switzer's position. Switzer does not contend that urea in the 4-C formula is the equivalent of melamine in the Kazenas claim. Switzer's position is that the 4-C formula consists of the same essential three components as the Kazenas claim, plus an amount of urea, unessential to the desired characteristics.

The Court concludes, therefore, that the Kazenas claim, which consists essentially of the product of a mixture of certain proportions of aldehyde, sulfonamide and melamine, covers the 4-C formula, which calls for a mixture of the same components in substantially identical proportions plus a small amount of urea, which is not essential to produce the desired characteristics of the resin. In other words, Radiant's 4-C resin performs substantially the same function in substantially the same way to accomplish the same result as Switzer's resin. The Court previously determined that Radiant's old R-104 resin infringed Switzer's patent. It follows that the 4-C resin, which is in every essential aspect equivalent, also infringes. *Hopp Press Inc. v. Joseph Freeman & Co.*, 323 F. 2d 636 (2d Cir. 1963).

The Court concludes that Radiant has violated its Writ of Perpetual Injunction, dated May 2, 1962; that the issue of Radiant's violation is not doubtful; that the differences

between Radiant's R-104 resin and 4-C resin are merely colorable; and that, therefore, this is a proper case for contempt.

As to whether Switzer is entitled to treble damages on the grounds that Radiant's infringement has been wilfull and deliberate (35 USC Sec. 284), the Court withholds final judgment until the accounting has been completed in order that the full nature and extent of the infringement can be disclosed. *E-I-M Company v. Philadelphia Gear Works*, 223 F. 2d 36 (5th Cir. 1955), cert. den. 350 U.S. 933 (1955). The Court also withholds a determination of the allowance of reasonable attorneys' fees under Sec. 285. Jurisdiction as to both matters is specifically reserved.

Switzer will prepare an order in accordance with this Memorandum, submit it to Radiant for approval and then submit it to the Court within 14 days.

Dated: March 31st, 1964.

United States District Judge

United States Court of Appeals
for the Ninth Circuit

Harry P. Locklin and Elmer J. Brant, General partners doing business under the firm name of Radiant Color Company, Plaintiffs-Appellants, vs. Switzer Brothers, Inc., a corporation, Defendant-Appellee.	No. 19,467

[June 30, 1965]

On Appeal from the United States District Court
for the Northern District of California,
Southern Division.

Before: Barnes, Jertberg and Merrill, Circuit Judges.

Merrill, Circuit Judge:

This appeal is taken from an order adjudging appellants guilty of civil contempt for violation of an injunction against infringement of appellee's patent. The injunction was issued pursuant to mandate of this court following our decision holding appellee's patent valid and infringed, *Locklin v. Switzer Bros., Inc.*, 299 F.2d 160 (9 Cir. 1961); cert. denied, 369 U.S. 861 (1962).

The patent there in issue, the Kazenas patent,[1] was for a resin which was a co-condensation of a melamine, a sulfonamide and an aldehyde, and which possessed char-

[1]Letters patent No. 2,809,954, assigned to Switzer.

acteristics of substantial importance in the manufacture of pigments for use in fluorescent paint. Following our earlier decision and the injunction against infringement, appellants produced and utilized a resin designated as "4-C," which utilized the three ingredients of the Kazenas formula with the addition of a relatively small amount of urea. Appellee then initiated these proceedings contending that production of the 4-C resin constituted a violation of the court's injunction. The District Court agreed.

Appellants make two contentions upon this appeal.

The first relates to the procedures followed by the District Court. The court treated the matter as one on motion under Rule 43(e) F.R.C.P. rather than as a trial for infringement under Rule 43(a). Accordingly proof was received in the form of affidavits. Appellants now assert that this was error, since factual determinations were required upon critical issues. We agree.[2] The error, however, would appear to have been invited if not waived.

At the outset of the proceedings appellants expressed the view that the matter could not adequately be tried on affidavits and that "on a matter of such seriousness as this we should bring our witnesses before the court." It was ultimately decided, however, without objection by appellants, that the matter should proceed initially by affidavit; that if an analysis of the affidavits disclosed

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[2]That trial under Rule 43(a) is the appropriate method of resolving issues raised by opinion testimony in patent cases is suggested in Moore's Federal Practice, §43.03, where it is stated in comment upon this rule:

> "It follows, therefore, that the practice under Equity Rule 48, in patent and trade-mark actions, of setting forth in affidavits the testimony in chief of expert witnesses whose testimony is directed to matters of opinion, is no longer proper."

genuine conflicts in contentions of fact or opinion the question of the calling of witnesses might then be renewed. The record does not disclose that appellants, at the time of hearing, renewed their contention that issues disclosed by the affidavits would justify the calling of witnesses. No offer of oral testimony was made.

Upon the merits of the dispute appellants contend that their accused formula 4-C does not fall within the narrow limits of the Kazenas patent as delineated in our earlier opinion. Notwithstanding the fact that the amount of urea used by them is relatively small, still, they assert, the urea is used in place of melamine, and reduces the amount of melamine which is utilized to a point where the melamine alone is not sufficient to render the product substantially insoluble in aromatic hydrocarbon solvents.

Appellee asserts that this is not the proper test and that the claims of the Kazenas patent should not be so limited. It points out that the amount of melamine utilized by appellants is well within the spread fixed by the minimum and maximum limits set forth in the Kazenas claims and within the area covered by the examples given. It contends, as was argued to the District Court, that the true issues are whether the 4-C resin is equivalent to the infringing resin to which the injunction was directed, and whether the urea was essential to produce the desired characteristics of 4-C.

We cannot agree. In our judgment if appellants' contentions are factually correct there would be no infringement. In our earlier opinion we ruled that the use of this functional language in specifying the amount of melamine required (an amount sufficient to render the condensation

product substantially insoluble in aromatic hydrocarbon solvents, but insufficient to render it thermosetting) did not invalidate the claims, but by the same token it served to fix precisely the limits of the claims.

Upon the specific issue here raised by appellants the District Court has made no findings. It does not appear, however, that this precise issue was clearly directed to the court's attention.

We are thus hard put to find reversible error upon the record as to either of appellants' contentions.

We do feel, however, that in all fairness appellants are entitled to trial upon this issue. While the District Court acted with commendable concern for the conservation of trial time, the result was to encourage counsel to submit to summary proceedings, which, as a matter of hindsight, would now appear to have been inappropriate. The summary character of the proceedings, in turn, may well have contributed to the result that issues not overly apparent in the absence of cross-examination were not thoroughly explored and presented at the time of argument.

The record does not, however, suggest that trial upon any other issue is similarly justified under the circumstances. In all other respects the order of the District Court is entitled to affirmance.

Accordingly the matter is remanded with instructions that the order of the District Court be set aside and that trial be had upon the sole question whether, in the 4-C resin, the amount of melamine utilized is such as to bring the resin within the limits of the claims of the Kazenas patent as those claims are delineated in our former opinion.

In the United States District Court for the
Northern District of California,
Southern Division

Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, Plaintiffs, vs. Switzer Brothers, Inc., a corporation, Defendant.	No. 36995

MEMORANDUM OF DECISION

[Filed Feb. 17, 1966]

Sweigert, J.

This case is before the Court on a petition filed by defendant Switzer Brothers, Inc., (hereinafter referred to as Switzer) on May 8, 1963, for an order adjudicating plaintiffs, doing business as Radiant Color Company (hereinafter referred to as Radiant), in civil contempt for violation of the judgment of this Court, entered on November 17, 1959.

That judgment held that claims 1, 2, 3, 4 and 9 of Switzer's Kazenas patent were valid and were infringed by certain fluorescent pigments manufactured by Radiant. On appeal, the judgment was affirmed, *Locklin v. Switzer Bros., Inc.*, 299 F.2d 160 (9th Cir. 1961).

On May 2, 1962, an injunction was entered permanently enjoining Radiant from making, using, selling or offering for sale, except under license from Switzer any fluorescent pigment embodying or manufactured by the use of the inventions disclosed in the above claims of the Kazenas patent.

On March 31, 1964, this Court found Radiant guilty of civil contempt for violation of the injunction. Upon appeal, the Court in *Locklin v. Switzer Bros., Inc.*, 348 F.2d 244 (9th Cir. 1965) remanded the case for a determination of the specific question whether, in Radiant's accused 4-C resin, the amount of melamine utilized is such as to bring the resin within the limits of the claims of Switzer's Kazenas patent, No. 2,809,954, as those claims were delineated in the Court's prior opinion in 196f.

Pursuant to the remand, this Court held an evidentiary hearing on the above question from October 11, 1965, to October 15, 1965.

Radiant contends that its accused formula 4-C resin does not fall within the following functional language of claim 2 of the Kazenas patent:

> "[T]he amount of said melamine compound being an amount . . . sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents. . . ."

Specifically, Radiant contends that, notwithstanding the fact that the amount of urea used by them in the 4-C resin is relatively small, the urea is used in place of melamine, and reduces the amount of melamine to a point where the melamine alone is not "sufficient to render said

condensation product substantially insoluble in aromatic hydrocarbon solvents."

The 1965 Court of Appeals decision held that, if Radiant's contention is factually correct, there would be no infringement, stating with regard to the above language of claim 2 of the Kazenas patent:

> "In our earlier opinion we ruled that the use of this functional language in specifying the amount of melamine required . . . did not invalidate the claims, but by the same token it served to fix precisely the limits of the claims." *Locklin v. Switzer Bros., Inc.*, supra at 246.

In its earlier opinion the Court had found that the language was not vague, stating:

> "There is testimony to the effect that 'sufficient melamine to render the resin substantially insoluble' is a simple, clear test for an ordinary chemist to perform and one which does not require extensive experimentation in order that the precise critical limits be ascertained in a particular case. Under such circumstances, the fact that some preliminary testing is required does not render the claim invalid for vagueness." *Locklin v. Switzer Bros., Inc.*, supra at 166.

The Court had also pointed out the reason why the lower limit of the amount of melamine, which would render the resin substantially insoluble, could not be stated in precise quantitative terms, stating:

> "Switzer points to the fact that of the considerable number of melamine compounds encompassed by the patent, each has a different critical limit. It asserts that this renders it wholly unreasonable to expect the claims to be specific in this respect or to expect any

> further specificity than that which appears in the examples given." *Locklin v. Switzer Bros., Inc.*, supra at 165-66.

Defendant Switzer, therefore, has the burden of showing the following in order to establish that Radiant is in civil contempt of this Court's injunction.

1. A simple clear, reliable test for an ordinary chemist to perform and one which does not require extensive experimentation to show whether the accused resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents.

2. That in fact the accused resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents.

In order to sustain this burden, Switzer relies on two different kinds of tests: (1) the quick *qualitative* test, which was the test used at the original infringement trial and (2) the *quantitative* test.

Qualitative Tests

In the qualitative tests, Switzer manufactured and used a resin consisting of a co-condensation reaction of melamine, sulfonamide and formaldehyde in the same mole proportions as in the accused 4-C resin (i.e., 7 moles of formaldehyde, 4 moles of sulfonamide and 1 mole of melamine). Switzer eliminated entirely the one-half mole of urea from the test resin in order to show that there was sufficient melamine, without the urea, to render the resin substantially insoluble in aromatic hydrocarbon solvents.

Switzer conducted two qualitative tests. The first test was conducted on September 25, 1965, at Cleveland, Ohio, in the presence of Radiant. On that date, Switzer placed a measured quantity of its test resin in separate containers each holding one of the three aromatic hydrocarbon solvents—benzene, toluene and xylene.

The second test was conducted at trial, at which time Switzer placed a roughly measured quantity of its test resin in containers holding each of the aforesaid hydrocarbon solvents.

Both parties are in agreement that, if a finely ground resin is placed in an aromatic hydrocarbon solvent and it stays suspended without coalescence or agglomeration, then this is an indication that the resin is insoluble, while if the resin becomes coalesced or agglomerated, then this is an indication that the resin is not insoluble. There is dispute, however, over how long the resin must remain suspended without coalescence or agglomeration to come within the defining words of the patent claim: "substantially insoluble in aromatic hydrocarbon solvents."

At the original trial in 1959 before Judge Goodman, the Court considered only tests in pure toluene in determining whether the resin was substantially insoluble in an aromatic hydrocarbon solvent. Furthermore, at the original trial, the lapse of time between the date when the resin was placed in toluene and the date when the observations of the condition of the resin in the toluene were made, was less than one week.

Switzer demonstrated during this contempt hearing that its test resin remained free flowing and dispersed 24 hours

after being placed in the pure solvents. Switzer also demonstrated at the trial that the resin placed in the solvents on September 25, 1965, which had stood unshaken for 17 days, was free-flowing upon being shaken at the trial.

Radiant also made a number of test resins and conducted tests thereon in the pure solvents. One resin made by Radiant, designated JS-739, contained the following ingredients in the indicated mole proportions: 7 moles of formaldehyde, 4 moles of sulfonamide, 1 mole of melamine and one-half mole of urea. Another resin manufactured by Radiant designated JS-738, contained the same ingredients except the urea.

At the trial, Bennahmias, Technical Director of Radiant, testified (RT 404 et seq.) that on July 13, 1963, more than two years prior to trial, he placed a JS-738 resin in a container of benzene (Radiant's Exhibit No. 43) and that on July 28, 1963, he placed a JS-738 resin in a container of toluene (Radiant's Exhibit No. 44). Mr. Bennahmias then testified about the results of these 1963 tests. However, because these tests were not conducted under the observation of Switzer, as were later tests conducted by Radiant on September 3, 1965, and in light of the conflict in results between these tests and those conducted on September 3, 1965, the Court considers the latter tests more reliable.

In the inter-parties test in Richmond, California, held on September 3, 1965, Bennahmias testified that he placed a measured quantity of the JS-738 resin in containers of benzene (Radiant's Exhibit No. 17), toluene (Radiant's Exhibit No. 18) and xylene (Radiant's Exhibit No. 19).

The JS-738 resin, which was placed in benzene on September 3, 1965 (Radiant's Exhibit No. 17) was introduced in evidence by Radiant and appeared to be agglomerated at the time of trial. But the JS-738 resin, which was placed in the toluene on September 3, 1965, (Radiant's Exhibit No. 18) was free-flowing—notwithstanding Mr. Bennahmias' statement that he thought it was partly agglomerated (RT 418). Further, the JS-738 resin, which was placed in xylene on September 3, 1965 (Radiant's Exhibit No. 19), was also free-flowing at the time of trial.

Radiant relies greatly upon the test which showed that on the date of trial, the JS-738 resin, which had been placed in *benzene* on September 3, 1965, appeared to be agglomerated.

However, all resins of this type will eventually agglomerate in any pure aromatic hydrocarbon solvent. The stronger the solvent the less time it will take to agglomerate. According to the testimony of Dr. Von Fischer, and certain publications introduced at trial (RT 220-225), benzene has a very high solvent power, is the most volatile of the aromatic hydrocarbon solvents, is quite toxic and is not generally employed as a solvent in paint vehicles of the type herein used. Since benzene is the strongest of the three aromatic hydrocarbon solvents, a resin should agglomerate in it first.

Further, the testing of a resin in any pure aromatic hydrocarbon solvent is merely an indication of the substantial insolubility of the resin in a paint vehicle.

The mere fact that resin agglomerates within four or more weeks in a pure hydrocarbon solvent, such as

benzene, does not necessarily indicate that the resin will agglomerate in a paint vehicle in the same period of time. Pure hydrocarbon solvents are never used alone with resin in a paint vehicle, but only in conjunction with other liquids and substances which in effect reduce the strength of the pure solvent.

Thus, in a paint vehicle the resin will actually remain insoluble for a considerably longer period of time than in a pure solvent.

As demonstrated at trial by Switzer, resins made up in accordance with the examples in the Kazenas patent have remained free-flowing and dispersable in the paint vehicles for longer than five years (RT 102-113).

Mr. Bennahmias, testifying for Radiant, admitted at trial that tests of 48 hours and one week are indications that the pigment can be used satisfactorily in paint vehicles (RT 483)—although Radiant used other tests as well (RT 491).

The Court finds, therefore, that the benzene test conducted by Radiant, showing its JS-738 resin to have agglomerated in benzene after approximately seven weeks, does not disprove that the accused resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents.

The Court finds no merit in Radiant's contention that the results are not reliable because of certain differences between the kind of melamine Switzer used in its qualitative tests and that used by Radiant, and because of certain differences in the method of preparation of the test resin by Switzer.

It is, therefore, the finding of the Court that, when taken together, the 24 hour and 17 day qualitative tests conducted by Switzer, and the qualitative tests conducted by Radiant which showed that their JS-738 resin was free flowing and dispersed in toluene and xylene after approximately seven weeks, are simple clear reliable tests, which demonstrate that, in fact, the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents.

The Court, however, in no wise suggests that the above tests represent the minimum standard for determining the question presented or that the 24 hour qualitative test, alone, would not suffice for determining the question here. The Court merely holds that the above tests when considered together do in fact show beyond any doubt that the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents.

In addition to the above qualitative tests made by Switzer, Switzer also made a 24 hour quantitative test. In this test a carefully measured portion (.10 grams) of the JS-738 resin (which was a sample resin made by Radiant but without any urea) was deposited in 50 milliliters of each of the three pure solvents. In addition, a carefully measured portion of the JS-739 resin (also a sample made by Radiant but containing a half-mole of urea) was deposited in 50 milliliters of each of the three pure solvents.

After allowing all of these solutions to stand for 24 hours, Switzer determined how much of the resin had gone into solution, i.e., the solubility. Switzer determined that in benzene, .020 grams of the JS-738 resin had dissolved

per 100 milliliters of benzene, while .010 grams of the JS-739 resin had dissolved per 100 milliliters of benzene. In toluene, Switzer determined that .007 grams of the JS-738 resin had dissolved per 100 milliliters of toluene, while .002 grams of the JS-739 resin had dissolved per 100 milliliters of toluene. In xylene, Switzer determined that .003 grams of the JS-738 resin had dissolved per 100 milliliters of xylene, while .002 grams of the JS-739 resin had dissolved per 100 milliliters of xylene.

It appears, therefore, that in the 24 hour period only very minute quantities of the JS-738 resin and of the JS-739 resin went into solution.

Although these quantitative tests were not before the Court in the original infringement trial in 1959, the Court finds that the results of the quantitative tests with the JS-738 resin substantiate the findings of this Court with regard to the qualitative tests, to wit: that the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents.

Radiant's basic contention has been that the amount of melamine alone in the condensation product of formaldehyde, sulfonamide and melamine is insufficient to render the product substantially insoluble in aromatic hydrocarbon solvents and that its "4-C resins are rendered substantially insoluble in aromatic hydrocarbon solvents by using urea in addition to melamine, the urea being an essential ingredient without which the condensation product will agglomerate." *Radiant's Pre-Trial Brief*, p. 4.

The Court has already found that the amount of melamine by itself in the accused 4-C resin is sufficient to

render it substantially insoluble in aromatic hydrocarbon solvents.

Tending to further confirm this finding is the fact that the record before us indicates that, not only is the amount of melamine sufficient to render the condensation product substantially insoluble in aromatic hydrocarbon solvents, but also that the additional urea, itself, has little or no effect in producing such substantial insolubility.

The Court recognizes that the question whether the urea produces or tends to produce the substantial insolubility of the accused 4-C resin in the aromatic hydrocarbon solvents is *not* the determinative issue referred to this Court by the Court of Appeals.

Radiant, therefore, is under no obligation to demonstrate that it is the urea which produces the substantial insolubility of its 4-C resin in the aromatic hydrocarbon solvents. Rather, the burden of proof is upon Switzer to prove that, whatever the effect of the urea may be, the amount of melamine, alone, in the accused 4-C resin is sufficient to render it substantially insoluble in the aromatic hydrocarbon solvents.

Nevertheless, evidence tending to show that the urea has no effect, so far as the 4-C resins are rendered substantially insoluble in aromatic hydrocarbon solvents is concerned, tends to confirm the Court's finding that it is the melamine, alone, which renders the accused 4-C resin substantially insoluble in the aromatic hydrocarbon solvents.

In this connection, the record shows that, although Radiant introduced in evidence the containers of benzene,

toluene and xylene with the JS-738 resin (without urea), it did not introduce in evidence the containers of benzene, toluene and xylene which had the JS-739 resin (with urea) deposited in them on September 3, 1965, at the inter-parties test at Richmond, California.

It then became necessary for Switzer to introduce in evidence the container of benzene with the JS-739 resin (with urea). The Court examined this container of benzene with the JS-739 resin (with urea) and it appeared that this JS-739 resin (with urea) was in the same agglomerated condition as the JS-738 resin (without urea) and Bennehmias so admitted (RT 472).

If, as contended by Radiant, that its "4-C resins are rendered substantially insoluble in aromatic hydrocarbon solvents by using urea in addition to melamine", then it would seem that the agglomeration of the JS-739 resin (with urea) in benzene after approximately seven weeks demonstrates that the addition of urea had no apparent effect on the 4-C resin.

Our conclusion is that (1) either Radiant's contention that its "4-C resins are rendered substantially insoluble in aromatic hydrocarbon solvents by using urea in addition to melamine" is wrong or (2) the benzene tests which showed that after seven weeks the JS-738 resin (without urea) and the JS-739 resin (with urea) had agglomerated do not disprove that either resin is substantially insoluble in aromatic hydrocarbon solvents.

The Court has already found that the benzene test conducted by Radiant, showing its JS-738 resin to have agglomerated in benzene after approximately seven weeks,

does not disprove that the accused resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents.

After a review of the entire record, as discussed in this opinion, the Court finds, in answer to the question presented here, that in the 4-C resin, the amount of melamine utilized is such as to bring the resin within the limits of the claims of the Kazenas patent as those claims are delineated in *Locklin v. Switzer Bros., Inc.*, 299 F.2d 160 (9th Cir. 1961).

This Memorandum of Decision contains the Findings of Fact and Conclusions of Law as required by Fed. R. Civ. P. 52.

Dated: February 17th, 1966.

/s/ W. T. Sweigert
United States District Judge

United States Court of Appeals
for the Ninth Circuit

Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, Appellants, vs. Switzer Brothers, Inc., Appellee.	No. 20944

[October 24, 1966]

On Appeal from the United States District Court
for the Northern District of California
Southern Division

Before: Pope, Barnes and Merrill, Circuit Judges
Per Curiam:

This case has already been before the court twice. On the first occasion we upheld the District Court's determination that the Kazenas patent of appellee was valid and infringed. *Locklin v. Switzer Bros.*, 299 F.2d 160 (9th Cir. 1961). On the second occasion we reviewed the determination of the District Court that appellants, in marketing a new resin (one different from that originally held to infringe), were again infringing and guilty of contempt. On that second occasion we remanded the case to the District Court for determination of a specific factual

issue which we held to be crucial to the issue of infringement. *Locklin v. Switzer Bros.*, 348 F.2d 244 (9th Cir. 1965).

We noted (at page 246):

> "In our earlier opinion we ruled that the use of this functional language in specifying the amount of melamine required (an amount sufficient to render the condensation product substantially insoluble in aromatic hydrocarbon solvents, but insufficient to render it thermo-setting) did not invalidate the claims, but by the same token it served to fix precisely the limits of the claims."

We remanded with instructions (at page 246) "that trial be had upon the sole question whether, in the 4-C resin, the amount of melamine utilized is such as to bring the resin within the limits of the claims of the Kazenas patent as those claims are delineated in our former opinion."

The District Court has now tried this special issue, receiving expert testimony and exhibit evidence. Its findings of fact were incorporated in a memorandum decision. It expressly found "that the amount of melamine by itself in the accused 4-C resin is sufficient to render it substantially insoluble in aromatic hydrocarbon solvents." It concluded:

> "The court finds, in answer to the question presented here, that in the 4-C resin, the amount of melamine utilized is such as to bring the resin within the limits of the claims of the Kazenas patent as those claims are delineated in *Locklin v. Switzer Brothers, Inc.* 299 F.2d 160 (9th Cir. 1961)"

Appellants were adjudged guilty of contempt.

Appellants here attack the findings of the District Court. They contend that the court relied on the results of tests which, as a matter of law, were deficient in several respects (quantity of material tested; nature of the melamine compound used; length of time during which the resin remained insoluble and free flowing). These contentions go not to the relevance of the test evidence but to its weight—a consideration dealt with by the court in its opinion.

In our judgment the court's findings are not clearly erroneous. For the reasons set forth in its memorandum opinion judgment must be affirmed.

Appellants invite us, on the basis of subsequent developments, to re-examine our original determination that the claims of the Kazenas patent were sufficiently precise. We decline to do so.

Judgment affirmed.

United States Court of Appeals
for the Ninth Circuit

Harry P. Locklin, etc., et al., Appellants, vs. Switzer Brothers, Inc., Appellee.	No. 20,944

APPEAL from the United States District Court for the Northern District of California, Southern Division.

THIS CAUSE came on to be heard on the Transcript of the Record from the United States District Court for the Northern District of California, Southern Division, and was duly submitted.

ON CONSIDERATION WHEREOF, It is now here ordered and adjudged by this Court, that the judgment of the said District Court in this Cause be, and hereby is affirmed.

Filed and entered October 24, 1966

United States Patent Office 2,809,954 Patented Oct. 15, 1957

2,809,954

THERMOPLASTIC MELAMINE-SULFONAMIDE-FORMALDEHYDE RESINOUS MATERIALS AND PROCESS FOR MAKING SAME

Zenon Kazenas, East Cleveland, Ohio, assignor, by mesne assignments, to Switzer Brothers, Inc., Cleveland, Ohio, a corporation of Ohio

No Drawing. Application January 26, 1954, Serial No. 406,331

13 Claims. (Cl. 260—45.2)

The present invention relates to a new thermoplastic resin and, more particularly, to a thermoplastic co-condensation product in which one of the components is melamine, derivatives thereof or the partial condensation products thereof with an aldehyde. The present invention also relates to a new pigment composed of one or more coloring materials dispersed or dissolved in the thermoplastic resin in a finely-divided condition and to casting or coating compositions containing such pigments, such as inks and the like.

Up to the present time it has not been possible to make useful thermoplastic resins which contain melamine-aldehyde condensation products. In fact, one of the outstanding characteristics of such melamine-aldehyde resins is the hard, infusible and insoluble character thereof after having been set.

The thermoplastic resin of the present invention is a co-condensation product of a melamine, an aromatic sulfonamide and an aldehyde such as formaldehyde. The new resin has a higher softening point than the well-known sulfonamide-aldehyde resins and has some characteristics which are in no way similar to the completely condensed melamine-aldehyde resins and other characteristics which are in no way similar to the thermoplastic sulfonamide-aldehyde resins. The new resin not only has a higher melting point than the sulfonamide-aldehyde resins, but it will release solvents more rapidly than such resins and does not exhibit cold flow at room temperatures as do the sulfonamide-aldehyde resins. On the other hand, the new resin, unlike the melamine-aldehyde resins, is soluble in certain solvents and is thermoplastic. The overall character of the new resin makes it especially suitable for the manufacture of pigments. For example, the new resin can be highly colored and, even though thermoplastic, can be readily ground to a finely-divided condition at temperatures below about 100° C. Most thermoplastic resins will either soften at the temperatures encountered during grinding or will tend to ball up or agglomerate, even at temperatures below the softening point, probably due to cold flow under the pressure of the grinding elements. The new resin is brittle and friable below its softening point and is not hornlike and tough, as are most thermosetting resins. The new resin is insoluble in many common vehicles and can therefore be suspended in such vehicles without coalescence or agglomeration.

In accordance with the invention, pigments are produced from the thermoplastic resins by dispersing a color material, such as a dye, into the resin. As disclosed herein, this may be done by any of three illustrative procedures. In accordance with two of these procedures, the colored resin is recovered in massive amorphous form and then ground to the desired particle size. In accordance with the third of these procedures, the resin particles are first formed by grinding the uncolored, solid, massive resin, and these particles are dyed by immersion in an aqueous dye bath. In all three cases, the final pigment particles are formed by the grinding

of a substantially non-porous, massive resin, as distinguished, for example, from merely breaking up agglomerates of fine particles produced by precipitation of the resin from a liquid solution, or the grinding of a thermosetting resin which has been cured in the solid state so as to form a relatively porous or "cheesy" mass.

By virtue of the brittle, friable character of the amorphous resins of the present invention and the lack of porosity of the resin mass at the time of grinding, the resins inherently break down with a conchoidal-like fracture that is characteristic of brittle, ground, amorphous materials, such as glass, and the resultant non-porous particles, having a minimum (or complete absence) of re-entrant surfaces, exhibit many outstanding qualities in coating compositions and particularly in printing inks. The ground resins resist subsequent agglomeration before, during, and after dispersion in a film-forming vehicle and resist settling in such vehicles to a remarkable degree. They have exceptionally low oil absorption characteristics and superior solvent release properties. They may be initially produced, stored and handled as relatively coarse sand-like particles up to the point of being mixed into a film-forming vehicle and are readily broken down to the desired ultimate particle size, without balling or agglomeration, while being ground into the vehicle on a conventional 3-roll mill or the like. And the coating compositions produced with such pigments, particularly printing inks, have exceptional working properties.

In so far as the new colored pigment is concerned, it has been found that the light-fastness of the new pigment is better than that of other colored pigments containing the same soluble dyestuffs. This characteristic renders the new resin particularly suitable for use with soluble fluorescent dyes and especially the rhodamines, the naphthalimides and the coumarins.

In this connection, a film of a known sulfonamide-aldehyde thermoplastic resin in which brilliant yellow 6G base had been incorporated showed a decided darkening after five hours in an Atlas weather-ometer. On the other hand, a film of completely condensed melamine-aldehyde resin containing the same dye showed an undesirable degree of darkening after five hours in the weather-ometer, although the darkening was not as bad as in the case of the thermoplastic resin. However, a similar film of the new thermoplastic resin, according to the present invention, with the same percentage of the same dye showed substantially no darkening after five hours in the weather-ometer.

The present thermoplastic resin may be prepared from an aromatic monosulfonamide having two reactive hydrogens, i. e., two reactive amide hydrogens, melamine or a melamine derivative having at least two functional amide groups and formaldehyde or paraformaldehyde. If desired, either or both of the first-mentioned components may be separately reacted with formaldehyde to form a thermoplastic sulfonamide-aldehyde resin or a B-stage (partially condensed) melamine-aldehyde resin, respectively, before being co-condensed. The aromatic sulfonamide may comprise a mixture of o- and p-toluene sulfonamides, benzene sulfonamide or the alkyl derivatives thereof or α toluene sulfonamide, in which the sulfonamido group is attached directly to the aromatic nucleus through the sulfur atom.

The B-stage partially condensed methylol melamine (melamine-aldehyde) resin is the water-soluble, thermofusible reaction product of melamine and formaldehyde or paraformaldehyde. In place of melamine, one can use the methyl melamine or other alkyl derivatives of melamine, such as the mono- or dialkyl derivatives where the alkyl group may be methyl, ethyl, propyl, butyl or the like.

Also the B-stage methylol melamine resin can be modi-

fied by forming the alkyl ether of the methylol melamine. This can be done by taking an A-stage methylol melamine, i. e., the tri-, tetra- or penta-methylol melamine, and then converting to the B-stage resin in the presence of an alkanol such as methanol, ethanol, propanol, butanol and the like. When using methanol, the modified B-stage resin would be the mono-, di or trimethyl ether of tri-, tetra- or pentamethylol melamine, in partially condensed form.

The relative quantities of the materials to be co-condensed are critical only to the extent that more than about 20% by weight of the unmodified melamine-formaldehyde B-stage resin in the final product will produce a thermosetting product, which is not desired, and, if too small a quantity of the melamine resin is used, the softening point of the product will differ only slightly from the softening point of the aromatic sulfonamide-formaldehyde resin. In other words, the amount by weight of the sulfonamide-aldehyde resin should be at least four times the amount of the unmodified B-stage melamine-aldehyde resin. When the unmodified melamine-formaldehyde B-stage resin is employed, it is preferred to use about 16% thereof based on the weight of the final co-condensed resin, i. e., about five times as much of the sulfonamide-aldehyde resin as the unmodified B-stage melamine-aldehyde resin. When the melamine derivatives or the modified B-stage melamine resins are used, greater relative quantities can be employed, up to about 25–35% by weight of the final product, i. e., up to about 50% by weight of the sulfonamide-aldehyde resin. Generally, when employing a melamine derivative to form the B-stage partially condensed resin, or when preparing the alkanol modified melamine resin, it is desirable to use greater quantities of formaldehyde so as to provide additional methylol groups for subsequent co-condensation with the sulfonamide-formaldehyde resin. The B-stage melamine-formaldehyde resin, i. e., the methylol melamine, must have at least two methylol groups and preferably three or four such groups in order to successfully carry out the subsequent co-condensation with the sulfonamide resin.

The various melamine derivatives having at least two functional amide groups, which are useful substitutes for melamine for the purposes of the present invention, include all of such derivatives mentioned in the foregoing discussion. Stated most simply, by way of summary, they include alkyl melamines having no more than one alkyl substituted amido nitrogen and monohydric alkanol modified methylol and alkyl methylol melamines.

As will be noted from the following Examples 2, 3, 4, and 5 on the one hand and Example 6 on the other, the resins of the present invention may be prepared using either formaldehyde or its polymer, paraformaldehyde, as reactants. This monomer and its polymer, in which the same atoms are present in the same proportion, should be distinguished from isomerides of formaldehyde, such as diformaldehyde containing a plurality of aldehyde groups in a stable molecule.

The present invention will now be described in greater detail by reference to the following examples:

Example 1

360 grams of mixed o- and p-toluene sulfonamide-formaldehyde resins were melted at 60°–70° C. and then heated to 125° C. At this temperature 78.4 grams of B-stage unmodified melamine-formaldehyde resin were added and dissolved therein. The solution became clear at about 150° C., and heating was continued up to 170° C. and held there for about ten minutes. Upon cooling, the co-condensed resin began to solidify at about 115° C. The product (94.5% yield) was a clear water-white resin which, below about 100° C. was brittle, friable and easily ground in a micropulverizer or by wet ball milling into a finely divided powder.

Example 2

180 grams of mixed o- and p-toluene sulfonamide-formaldehyde resins were melted at about 60°–70° C. and then heated up to about 130° C. 20 grams of melamine were added, and after about ten minutes the solution became clear; then 14.3 grams of paraformaldehyde were added at 120° C. The entire mixture was then heated up from 120° C. to between 170° C. and 175° C. while stirring over a thirty minute period. The mixture was then clear. Upon cooling, the resin began to solidify at about 105° C. Below 100° C. the resin, which was clear and water-white, became brittle and friable, as in Example 1.

Example 3

167 grams of a mixture of o- and p-toluene sulfonamide, 29.4 grams of paraformaldehyde and 39.2 grams of the B-stage unmodified melamine-formaldehyde resin were heated together to a temperature of about 170° C. for about fifteen minutes. Upon cooling, the resin began to solidify at about 115° C. The resin was clear and water-white, and below about 100° C. it was brittle and friable, as in Example 1.

Example 4

168 grams of a mixture of o- and p-toluene sulfonamide and 29.4 grams of paraformaldehyde were heated together to a temperature of about 170° C., while stirring, and maintained at that temperature for about twenty minutes. To this resin, at 115–120° C., were added 39 grams of the B-stage unmodified melamine-formaldehyde resin, and the mixture was heated up to 170° C. for fifteen minutes. The resin had a softening point of 115° C. and physical characteristics substantially the same as in Examples 1, 2 and 3.

Example 5

154.1 grams of a mixture of o- and p-toluene sulfonamide were heated to 120° C. 20.1 grams of melamine were then added and stirred at 120° C. for fifteen minutes. 41.3 grams of paraformaldehyde were added in about seven equal portions over a period of about twenty minutes while the temperature was kept at about 115–120° C. After all of the paraformaldehyde was added, the temperature was raised to 170° C. for about fifteen minutes. The product resin had a softening point of about 112° C. The resin had the physical characteristics of the resins in the foregoing examples.

Example 6

To 155 grams of formalin (38% concentration) was added sufficient KOH (20% solution) to adjust the pH value of the formalin to about 9. Then 168 grams of a mixture of o- and p-toluene sulfonamide was added. The mixture was heated to 100° C. and maintained at that temperature until all water had been evaporated. The temperature was then raised to 150° C. and held there for 10–15 minutes. About 180 grams of the sulfonamide-aldehyde resin was formed. To this resin, at 115° C., was added 39 grams of the B-stage melamine-aldehyde resin, and the mixture was then heated up to 170° C. with stirring and held up at that temperature for 15–20 minutes. The resulting product, as in the prior examples, softened at about 115° C. and was brittle and friable below about 100° C.

Any of the foregoing clear resins, which may have been reduced to a finely divided powder by grinding and/or milling, can be colored to form a colored resin by dissolving the resin and dye in a ketone or an ester solvent followed by evaporating the solvent. On the other hand, if desired the resin can be melted at temperatures above about 130° C. and the dye added to the melt. In either case, the colored resin can be easily reduced to a finely divided pigment form at temperatures below about 100° C.

Colored pigments can be prepared by introducing the dye during the manufacture of the resins in the manner described in the following examples. In preparing fluorescent pigments from the rhodamines, naphthalimides and/or coumarins, it is preferable that the dye be completely dissolved in the resin. Additionally, the resin may be colored by other coloring materials such as insoluble dyes, dyestuffs, organic or inorganic pigments, flatting and opacifying agents or the like by dispersing any such coloring materials in the resin.

Example 7

During the production of the resin as described in Example 1, a dye may be added when the mixture has reached a temperature of between 150° C. and 160° C., while heating up to 170° C. When 8.16 grams of brilliant yellow 6G base (4 amino 1,8 naphthal 2'4' dimethyl phenylimide) and .9132 gram of rhodamine 6 GDN Extra (Color Index No. 752) are added, the final resin has an orange-yellow color which is strongly daylight fluorescent when applied to surfaces by various printing methods.

Example 8

If 4.02 grams of rhodamine B Extra (Color Index No. 749) and 4.02 grams of rhodamine 6 GDN Extra are added to the molten mixture of Example 1 in the manner shown in Example 7, the resulting colored resin pigment is a bluish-red which is also strongly daylight fluorescent when applied to a surface as an ink.

Example 9

If 12.45 grams of brilliant yellow 6G base are added in place of the dyes mentioned in Example 8, the resulting pigment will be a lemon yellow which is also highly daylight fluorescent.

Example 10

If If 1.37 grams of rhodamine B Extra, 2.07 grams of rhodamine 6 GDN Extra and 4.12 grams of brilliant yellow 6G base are added in place of the dyes used in Example 8, the resulting pigment is a fiery-orange and is highly daylight fluorescent.

Example 11

If 4.02 grams of malachite green (Color Index No. 657) are added to the resin in place of the dyes used in Example 8, the product has the characteristic green color of that dye.

Example 12

4.1 grams of 4-methyl-7-diethylamino coumarin were added to the resin in the manner described in Example 7. The resulting product was a colorless resin which could be easily ground to a fine powder and which gave a bright blue color when exposed to ultra-violet light.

If desired, the undyed resin may be prepared as in Examples 1 to 6 and dyed by immersion in an aqueous dye bath.

Example 13

A dye bath was prepared as follows:

40 cc. water
1.0 gram iso-octyl phenyl ether of polyethylene glycol, known as "Triton X-100"
10.0 cc. formic acid (90% solution)
.05 gram rhodamine B Extra
.05 gram rhodamine 6 GDN Extra

The above materials were dissolved to form a 0.2% dye bath and 5 grams of the powdered resin of Example 1 were added. The dye concentration was 2% based on the weight of the resin. The dye bath and resin were warmed to a temperature not above 46° C. for three minutes, and the dyed resin was then filtered from the bath and washed with cold water until the water was substantially colorless. By comparing the color of the dyed resin and the color of a resin containing 1% of the same dyes which had been incorporated during manufacture as in Example 8, it was estimated that the resin powder contained 1% of the dye.

The pigments prepared in the manner described in the foregoing examples are insoluble in water and aliphatic hydrocarbon solvents, are practically insoluble in aromatic hydrocarbon solvents, and are soluble in ketones and solvent esters. When the pigments of Examples 7 to 12 are ground, or the resins from which they are produced are ground for subsequent dyeing to colored and/or fluorescent pigments in accordance with Example 13, the amorphous resins break down into conchoidally fractured discrete fragments which are substantially non-porous and are relatively free from re-entrant surfaces forming depressions or pockets which might tend to entrap air and thereby hinder rapid and complete surface wetting when grinding the particles into a vehicle. These non-porous resin particles, suitably dyed or colored, exhibit the many outstanding pigment qualities in coating compositions which were enumerated above.

Based on these physical characteristics, the pigments may be used in vehicles which are non-solvents for the pigments to form various types of inks and the like. If desired, the resin can be dissolved in solvent-type volatile vehicles to form coating compositions of varied properties. Also they may be used in spirit varnish compositions to which film formers such as the vinyl polymers and copolymers, cellulose acetate, etc., have been added. In such compositions, when film formers are not employed, it is generally desirable to add small percentages of conventional plasticizers so as to give the applied films sufficient flexibility.

The following example is a composition containing the new resin used as a suspended pigment for use as a silk screen ink. Percentages given are by weight:

Example 14

	Percent
Long oil alkyd (soya type—50% solids)	40.6
Aluminum stearate gel	8.6
Driers (metal naphthenates)	0.3
Kerosene	6.5
Pigment as per Example 7	44.0

The above ink when applied by the silk screen process results in a bright yellow having a slightly orange tint.

Example 15

The resin of the present invention may also be used for coating compositions. For coating wood, the following formulation may be used:

14 grams colorless resin of Example 1
22 grams low viscosity cellulose butyrate
12 grams dioctyl phthalate plasticizer
25 grams methyl ethyl ketone
25 grams ethyl acetate
10 grams toluene
0.15 gram rhodamine B Extra
0.15 gram rhodamine 6 GDN Extra

If a sprayable composition is desired, the above formulation may be thinned out with an additional 25 grams of ethyl acetate and 25 grams of toluene. The resulting coating is transparent and has a reddish color. A white or other colored primer coat may be applied to the wood before applying the resin coating so as to provide a diffusely reflecting background. Such a primer coat should be used when coating a metal or the like.

Although the present invention has been described with reference to the foregoing examples, it will be understood that various modifications will occur to those skilled in the art, and it is intended that such modifications as come within the scope of the appended claims be covered thereby.

What is claimed is:

1. A completely condensed, thermoplastic resin con-

sisting essentially of the condensation product of a first component (A) selected from the class consisting of (*a*) a mixture of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and at least one aromatic monosulfonamide having two reactive amide hydrogens, where the sulfonamido group is attached directly to the aromatic nucleus through the sulfur atom, and (*b*) a thermoplastic condensation product of the constituents of mixture (*a*), and a second component (B) selected from the class consisting of (*c*) a mixture of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and at least one melamine compound selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, and (*d*) a thermofusible partial condensation product of the constituents of mixture (*c*), the amount of said second component (B) being an amount, not exceeding about 50% by weight of said component (A), sufficient to render said completely condensed, thermoplastic resin substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting.

2. A completely condensed, thermoplastic resin consisting essentially of the condensation product of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde, at least one aromatic monosulfonamide having two reactive amide hydrogens, where the sulfonamido group is attached directly to the aromatic nucleus through the sulfur atom, and at least one melamine compound selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, the amount of said melamine compound being an amount, not exceeding 50% by weight of the aromatic monosulfonamide, sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting.

3. A completely condensed, thermoplastic resin according to claim 2 in which the aromatic monosulfonamide component is toluene monosulfonamide.

4. A completely condensed, thermoplastic resin according to claim 2 in which the aromatic monosulfonamide component is a mixture of o- and p-toluene monosulfonamides.

5. A completely condensed, thermoplastic resin according to claim 2 in which said melamine compound is melamine and the amount thereof does not exceed 25% by weight of the aromatic monosulfonamide.

6. A completely condensed, thermoplastic resin according to claim 2 in which the aromatic monosulfonamide component is toluene monosulfonamide and said melamine compound is melamine, the amount of said melamine not exceeding 25% by weight of the aromatic monosulfonamide.

7. A completely condensed, thermoplastic resin according to claim 2 in which the aromatic monosulfonamide component is toluene monosulfonamide and said melamine compound is melamine, the amount of said melamine not exceeding 20% by weight of the aromatic monosulfonamide.

8. A completely condensed, thermoplastic resin consisting essentially of the co-condensation product of: (*a*) a thermoplastic condensation product of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and at least one sulfonamide component entirely selected from the class consisting of aromatic monosulfonamides having two reactive amide hydrogens, where the sulfonamido group is attached directly to the aromatic nucleus through the sulfur atom, and (*b*) a thermofusible resinous partial condensation product of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and at least one melamine component entirely selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, the amount of said thermofusible resinous partial condensation product (*b*) being an amount, not exceeding about 50% by weight of said thermoplastic condensation product (*a*), sufficient to render said co-condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting.

9. A process of producing a completely condensed, thermoplastic, resinous condensation product comprising condensing, at a temperature up to 170° C., a mixture consisting essentially of a first component (A) selected from the class consisting of (*a*) a mixture of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and at least one aromatic monosulfonamide having two reactive amide hydrogens, where the sulfonamido group is attached directly to the aromatic nucleus through the sulfur atom, and (*b*) a thermoplastic condensation product of the constituents of mixture (*a*), and a second component (B) selected from the class consisting of (*c*) a mixture of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and at least one melamine compound selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, and (*d*) a thermofusible partial condensation product of the constituents of mixture (*c*), the amount of said second component (B) being an amount, not exceeding about 50% by weight of said first component (A), sufficient to render said completely condensed, thermoplastic, resinous condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting.

10. A process of producing a completely condensed, thermoplastic resinous condensation product comprising condensing, at a temperature up to 170° C., (A) a thermoplastic condensation product of an aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and at least one sulfonamide component entirely selected from the class consisting of aromatic monosulfonamides having two reactive hydrogens, where the sulfonamido group is attached directly to the aromatic nucleus through the sulfur atom, and a second component (B) entirely selected from the class consisting of (1) a mixture of at least one aldehyde component selected from the class consisting of formaldehyde and paraformaldehyde and at least one melamine component selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, and (2) a thermofusible partial condensation product of the constituents of mixture (1), the amount of said second component (B) being an amount, not exceeding about 50% by weight of said thermoplastic condensation product (A), sufficient to render said completely condensed, thermoplastic, resinous condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting.

11. A process of producing a completely condensed, thermoplastic, resinous condensation product comprising condensing, at a temperature up to 170° C., (A) a thermoplastic condensation product of an aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and a mixture of o- and p-toluene monosulfonamides, and a second component (B) entirely selected from the class consisting of (1) a mixture of at least one aldehyde component selected from the class consisting of formaldehyde and paraformalde-

hyde and at least one melamine component selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, and (2) a thermofusible partial condensation product of the constituents of mixture (1), the amount of said second component (B) being an amount, not exceeding about 50% by weight of said thermoplastic condensation product (A), sufficient to render said completely condensed, thermoplastic, resinous condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting.

12. A process of producing a completely condensed, thermoplastic, resinous condensation product comprising condensing, at a temperature up to 170° C., a mixture consisting essentially of a first component (A) entirely selected from the class consisting of (1) a mixture of at least one aldehyde component selected from the class consisting of formaldehyde and paraformaldehyde and at least one aromatic monosulfonamide having two reactive amide hydrogens, where the sulfonamido group is attached directly to the aromatic nucleus through the sulfur atom, and (2) a thermoplastic condensation product of the constituents of mixture (1), and a second component (B) consisting of a thermofusible partial condensation product of a mixture of at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde and at least one melamine component entirely selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, the amount of said second component (B) being an amount, not exceeding about 50% by weight of said first component (A), sufficient to render said completely condensed, thermoplastic resinous condensation product substantially

insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting.

13. A process for producing a completely condensed, thermoplastic, resin comprising melting a thermoplastic resinous material consisting essentially of the condensation product of an aldehyde entirely selected from the class consisting of formaldehyde and paraformaldehyde and a sulfonamide entirely selected from the class consisting of aromatic monosulfonamides having two reactive amide hydrogens, where the sulfonamido group is attached directly to the aromatic nucleus through the sulfur atom, raising the temperature of the molten condensation product to about 125° C., dissolving therein a thermofusible partial condensation product of melamine and an aldehyde entirely selected from the class consisting of formaldehyde and paraformaldehyde, raising the temperature of the resulting solution to about 170° C. for about 10 minutes, and cooling the solution to below 100° C. to solidify the resulting resinous condensation product, said thermofusible partial condensation product being incorporated in an amount, up to about one-fifth the amount of the aldehyde-sulfonamide condensation product, sufficient to render said resulting resinous condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting.

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UNITED STATES PATENT OFFICE

Certificate of Correction

Patent No. 2,809,954 October 15, 1957

Zenon Kazenas

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 61, strike out "or α toluene sulfonamide"; line 63, after "atom" and before the period insert —, or α toluene sulfonamide —.

Signed and sealed this 28th day of January 1958.

[SEAL]

Attest:
KARL H. AXLINE,
Attesting Officer.

ROBERT C. WATSON,
Commissioner of Patents.

STATISTICAL DATA REFERRED TO IN PETITION*

CASES 1943 THROUGH 1947

Sylvania Industrial Corporation v. Visking Corporation (4 Cir. 1943), 132 F.2d 947, petition dismissed under Rule 60 (1943), 319 U.S. 777. The Court of Appeals reversed an unreported District Court decision and held that a patentee may not broaden a product claim by describing the product in terms of its use or function so as to include methods not described in the patent, citing *General Electric,* among other cases.

Detachable Bit Co. v. Timken Roller Bearing Co. (6 Cir. 1943), 133 F.2d 632, affirming *Detachable Bit Co. v. Timken Roller Bearing Co.* (N.D. Ohio, E.D. 1941), 41 F. Supp. 37. In this case, the claims used indeterminate adjectives to describe the functions "wear resisting properties", "anti-fatigue properties" and "shock absorbing properties." In affirming the District Court and holding the claims invalid, the Court of Appeals relied in part upon *General Electric.*

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*These statistical data form the basis for petitioners' Ground 1 of their petition, pages 10-13. The data were prepared by Shepardizing *Minerals Separation, Ltd. v. Hyde* (1916), 242 U.S. 261; *Gen. Electric Co. v. Wabash Co.* (1938), 304 U.S. 364; *Standard Brands v. Yeast Corp.* (1939), 308 U.S. 34; *United Carbon Co. v. Binney Co.* (1942), 317 U.S. 228; and *Halliburton Co. v. Walker* (1946), 329 U.S. 1, for the periods 1943 through 1947 and 1961 to date. All cases which counsel located bearing on definiteness of claiming have been included. All petitions for the writ of ceritorari resulting from the cited cases have been examined. The data are believed to be complete to the extent that all Court of Appeals decisions discussing definiteness of claiming for the respective periods have been included in the text. Where a decision holds some claims definite and other claims indefinite, such case has been treated as one-half case supporting the statutory defense and one-half case rejecting it.

Libbey-Owens-Ford Glass Co. v. Celanese Corporation (6 Cir. 1943), 135 F. 2d 138, cert. den. (1943), 320 U. S. 744, reversing an unreported judgment of lower court. The Court of Appeals held that the statutory definiteness was not met where the "determination of the sufficient amount of plastifier was a matter of experimentation." The petition filed in the October Term, 1943, No. 149, does not mention the cited line of authorities.

Mead Johnson & Co. v. Hillman's (7 Cir. 1943), 135 F. 2d 955, affirming *Mead Johnson & Co. v. Hillman's Inc.* (N.D. Ill. E.D. 1942), 72 F. Supp. 253, cert. den. (1943), 320 U. S. 752. Citing *General Electric,* the Court of Appeals applied the rule that functional statements cannot be availed of to define novelty over the prior art. The petition filed in the October Term, 1943, No. 204, does not mention the cited line of authorities.

Lever Bros. Co. v. Procter & Gamble Mfg. Co. (4 Cir. 1943), 139 F. 2d 633, reversing *Lever Bros. Co. v. Procter & Gamble Mfg. Co.* (D. Md. 1943), 49 F. Supp. 443. In reversing findings that the patented claims did not comply with the statute, the Court of Appeals distinguished *Standard Brands* and *United Carbon,* among others, and invoked *Minerals Separation* and *Eibel Process Co.,* among others.

Flexwood Co. v. Faussner & Co. (7 Cir. 1944), 145 F. 2d 528, affirming *Flexwood Co. v. Matt G. Faussner & Co.* (N.D. Ill. E.D. 1943), 59 USPQ 280. The Court of Appeals distinguished *United Carbon* by construing certain functional and indeterminate words in the light of the patent specifications.

Cleveland Punch & Shear Works Co. v. E. W. Bliss Co. (6 Cir. 1944), 145 F. 2d 991, affirming *E. W. Bliss Co. v. Cleveland Punch & Shear Works Co.* (N.D. Ohio E.D. 1943), 58 USPQ 598. The Court of Appeals rejected the statutory defense and distinguished *General Electric* and *United Carbon* by interpreting the claim by reference to the specification and drawings and found that no experimentation was needed in pursuit of the solution of an unsolved problem.

Bank v. Rauland Corporation (7 Cir. 1944), 146 F. 2d 19, affirming an unreported decision below. The court held that the terms "predetermined capacity", "minimum amplification", and "the prevention or reduction of capacity built up in the switch and circuit", did not comply with the statute and followed *General Electric.*

Vitamin Technologists v. Wisconsin Alumni Research F. (9 Cir. 1944), 146 F. 2d 941, reversing *Wisconsin Alumni R. F. v. Vitamin Technologists* (S.D. Cal. C.D. 1941), 41 F. Supp. 857, cert. den. (1945), 325 U. S. 876, reh. den. (1945), 326 U. S. 804. The Court of Appeals held invalid under the statute claims calling for "a period sufficient to effect antirachitic activation but so limited as to avoid subsequent substantial injury" under cases such as *United Carbon* and *General Electric.* The petition filed in the October Term, 1944, No. 1193, invokes *Minerals Separation.*

Timken Detroit Axle Co. v. Cleveland Steel Prod. Corp. (6 Cir. 1945), 148 F. 2d 267, affirming *Timken-Detroit Axle Co. v. Cleveland Steel P. Corp.* (N.D. Ohio E.D. 1943), 52 F. Supp. 317, cert. den. (1945), 326 U. S. 725,

reh. den. (1945), 326 U. S. 808. The Court of Appeals held that claims which called for "a relatively thin combustion ring of material of high heat conductivity" did not meet the statutory standard citing *General Electric* and *Libbey-Owens-Ford Glass Co.* The petition filed in the October Term, 1945, No. 137, urges a conflict with *Minerals Separation.*

Halliburton Oil Well Cementing Co. v. Walker (9 Cir. 1945), 149 F. 2d 896, denying rehearing in *Halliburton Oil Well Cementing Co. v. Walker* (9 Cir. 1944), 146 F. 2d 817, modifying an unreported District Court decision and reversed in *Halliburton Co. v. Walker* (1946), 329 U.S. 1. The Court of Appeals found that a functional claim did meet the statutory standard distinguishing *General Electric,* but this Court, following *General Electric,* found that the claims did not comply with the statute.

Rice v. Nash-Kelvinator Corporation (6 Cir. 1945), 150 F. 2d 457, affirming an unreported lower court decision. The Court of Appeals held that the description of a capillary tube as having "such length and diameter as will maintain a predetermined ratio between" two pressures described not the structure but the function or purpose to be achieved by the tube and thus invalidated the claim, citing *General Electric* and *United Carbon.*

Musher Foundation v. Alba Trading Co. (2 Cir. 1945), 150 F. 2d 885, cert. den. (1945), 326 U.S. 770. In reversing an unreported decision of the lower court, the Court of Appeals distinguished *General Electric* and *United Carbon* and followed *Eibel Process* to sustain the claims finding that all the terms used in the claim are anchored in

the specifications. The petition filed in the October Term, 1945, No. 500, urges a conflict with *General Electric* and *United Carbon.*

Schering Corporation v. Gilbert (2 Cir. 1946), 153 F. 2d 428, modifying *Schering Corp. v. Gilbert* (S.D. N.Y. 1945), 67 USPQ 42. The Court of Appeals, modifying an opinion of the District Court, held a narrow claim for an organic compound valid by reference to the specification and a broad claim invalid where the supporting specifications are no more at best than suggestions for experiment. Circuit Judge Frank filed a separate opinion agreeing that the broad claim was invalid but urging that the narrow claim was also invalid on the basis of *General Electric, United Carbon* and a plurality of other cases.

Standard Oil Co. v. Tide Water Associated Oil Co. (3 Cir. 1945), 154 F. 2d 579, affirming *Standard Oil Co. of Cal. v. Tide Water Assoc. Oil Co.* (D. Dela. 1943-1944), 55 F. Supp. 274. Both courts held that claims for a cracking process did not comply with the statute. The Court of Appeals followed *General Electric, United Carbon* and *Standard Brands,* among others, and held "no inventor may compel independent experimentation by others to ascertain the bounds of his claims. . . ."

Swenson v. Boos (8 Cir. 1946), 156 F. 2d 338, affirming *Swenson v. Boos* (D. Minn. 1945), 61 F. Supp. 704. Both courts held a patent for an artificial tooth invalid as anticipated. The Court of Appeals, citing *United Carbon* and *General Electric,* among others, held the claims indefinite because they did not clearly distinguish from the prior art.

Lincoln Stores v. Nashua Mfg. Co. (1 Cir. 1946), 157 F. 2d 154, modifying *Nashua Mfg. Co. v. Lincoln Stores, Inc.* (D. Mass. 1945, as amended), 66 USPQ 92, 493, cert. den. (1947), 329 U. S. 811. The District Court held four claims upon a blanket to be sufficiently definite under the statute and the Court of Appeals modified finding two of the claims valid and two invalid. Case cites *United Carbon*, among others. The petition filed in the October Term, 1946, No. 768, urges a conflict with *General Electric* and *United Carbon.*

Minnesota Mining & Mfg. Co. v. International Plastic Corp. (7 Cir. 1947), 159 F. 2d 554, affirming *Minnesota Min. & Mfg. Co. v. International Plastic Corp.* (N.D. Ill. E.D. 1945), 62 F. Supp. 34 and *Minnesota Mining & Mfg. Co. v. Pax Plastics Corp.* (N.D. Ill. E.D. 1946), 65 F. Supp. 303. In sustaining validity of claims to a cellophane tape, the Court of Appeals found the indefiniteness there present fully warranted by *Minerals Separation* and distinguished the functional language from *Halliburton* and *General Electric.*

Refrigeration Patents Corp. v. Stewart-Warner Corp. (7 Cir. 1947), 159 F. 2d 972, cert. den. (1947), 331 U. S. 834, reh. den. (1947), 332 U. S. 803. The Court of Appeals reversed an unreported judgment of the District Court based upon a jury verdict for failing to describe a refrigeration claim with the precision required by the statute as interpreted by the *Halliburton* case. The petition filed in the October Term, 1946, Nos. 1273 and 1274, requests clarification of *Halliburton.*

Kalo Inoculant Co. v. Funk Bros. Seed Co. (7 Cir. 1947), 161 F. 2d 981, reversed on other grounds in *Funk*

Bros. Seed Co. v. Kalo Co. (1948), 333 U. S. 127. The District Court in an unreported decision found claims for a bacterial inoculant invalid for want of invention. The Court of Appeals reversed and overruled a defense that the claims did comply with the statutory standards although they required routine experiments to select the various strains, quality or quantity of bacteria. The Court of Appeals relied upon *Eibel Process* and *Minerals Separation*, among others. This Court found the claims invalid for want of invention.

Hutzler Bros. Co. v. Sales Affiliates (4 Cir. 1947), 164 F. 2d 260, affirming *Sales Affiliates v. Hutzler Bros. Co.* (D. Md. 1947), 71 F. Supp. 287. Both courts held valid under the statute claims for a depilatory in which an alkaline material was stated as "being present in an amount sufficient to give the preparation a pH value between about 10 and 12.5." The Court discussed *General Electric* and held that any competent chemist versed in the cosmetic art would easily know how to add sufficient alkaline material to give the desired pH value.

CASES STARTING WITH LOCKLIN DECISION

Locklin v. Switzer Brothers, Inc. (9 Cir. 1961), 299 F. 2d 160, affirming *Locklin v. Switzer Bros., Inc.* (N.D. Cal. S.D. 1959), 125 USPQ 515, cert. den. (1962), 369 U. S. 861, reh. den. (1962), 369 U. S. 891. The courts below held that it was proper under U. S. Code, Title 35, Section 112, to describe the critical amount of melamine in a thermoplastic resin as "being an amount . . . sufficient to render

said condensation product substantially insoluble in aromatic hydrocarbon solvents but insufficient to render it thermosetting." The Court of Appeals distinguished *General Electric* and invoked *Minerals Separation* to sustain validity. The petition filed in the October Term, 1961, No. 803, presenting the question as to whether that language satisfied legal standards of definiteness invoked *General Electric, Halliburton* and *Standard Brands,* among other cases.

A R Inc. v. Electro-Voice, Incorporated (7 Cir. 1962), 311 F. 2d 508. The Court of Appeals affirmed an unreported District Court summary judgment and held, on the basis of *General Electric,* that patentable novelty could not be based upon the functional terms "the cubic volume of said enclosure being that value which will raise the natural frequency of said transducer to said operating value in accordance with the relationship. . . ." defined by a standard formula and which involved the "optimum resonant frequency" of the speaker system.

Hahn & Clay v. A. O. Smith Corporation (5 Cir. 1963), 320 F. 2d 166, affirming *Hahn & Clay v. A. O. Smith Corporation* (S.D. Texas 1962), 212 F. Supp. 22, cert. den. (1963), 375 U. S. 944. The Court of Appeals sustaining claims which did not specify the precise limits of force necessary to produce the desired result, distinguished *General Electric* and invoked *Minerals Separation.* The petition filed in the October Term 1963, No. 507, invoked *United Carbon* and *General Electric,* among other cases.

Devex Corporation v. General Motors Corporation (7 Cir. 1963), 321 F. 2d 234, cert. den. (1964), 375 U. S. 971. The Court of Appeals reversed an unreported District

Court judgment which held a patent claim too broad and lacking in specificity because it did not specify the kind of phosphate coating, the kind of organic binding, the kind of solid inorganic compounds as well as not specifying the amounts and relative proportions of any of such items. Relying upon *Binks Mfg. Co. v. Ransburg Electro-Coating Corp.* (7 Cir. 1960), 281 F. 2d 252, the court held that the claim was not too broad or indefinite. The petition filed in the October Term 1963, No. 618, Question 2, urged that a broadly worded patent claim for a process which does not specifically identify either the materials or quantities thereof required for operation of the process is invalid for failure to comply with Section 112. Conflict was urged with *General Electric* and *United Carbon,* among others.

Guiberson Corporation v. Webber (5 Cir. 1964), 336 F. 2d 461, affirming *Webber v. Guiberson Corporation* (S.D. Texas 1963), 231 F. Supp. 596, cert. den. (1965), 379 U. S. 989. Both courts sustained as valid claims having functional statements. The petition filed in the October Term 1964, No. 677, Ground Two, urged that the alleged novelty was presented in the functional terms and distinguished from the prior art in terms of function and that therefore, the sustaining of such claims was contrary to decisions including *United Carbon* and *General Electric.* Both decisions below are silent as to this defense but the brief for respondents shows that arguments that the claims were functional were repeatedly urged before both courts below and were rejected.

Tilotson Manufacturing Co. v. Textron, Inc., Homelite (6 Cir. 1964), 337 F. 2d 833. The court sustained claims

which required some testing invoking *Minerals Separation* (337 F. 2d 841):

Briggs v. M & J Diesel Locomotive Filter Corp. (7 Cir. 1965), 342 F. 2d 573, affirming *Briggs v. M & J Diesel Locomotive Filter Corp.* (N.D. Ill. E.D. 1964), 228 F. Supp. 26, cert. dismissed under Rule 60 (1965), 382 U. S. 801. The Court of Appeals sustained as valid under the statute claims directed to "pleats with walls of uneven depths" and claims which failed to specify the amount of shrinkage and a time period during which simultaneous bonding and shrinkage would occur. The decision was based on *Binks Manufacturing Company*. The petition filed in the October Term 1965, No. 326 urged conflict with *General Electric* and *United Carbon*.

Holley v. Outboard Marine Corporation (7 Cir. 1965), 345 F. 2d 351, affirming *Holley v. Outboard Marine Corporation* (N.D. Ill. E.D. 1964), 241 F. Supp. 657, cert. den. (1966), 383 U. S. 934, reh. den. (1966), 384 U. S. 914. The Court of Appeals agreed with the District Court's conclusion that claim 3 of the patent in suit was not functional (345 F. 2d 353) without discussion of the point. The petition filed in the October Term 1965, No. 499, urged a conflict with *General Electric*.

Arnold Pipe Rentals Co. v. Engineering Enterprises, Inc. (5 Cir. 1965), 350 F. 2d 885, affirming an unreported District Court judgment. The court distinguished *United Carbon* and invoked *Eibel Process* because "Absolute precision in the wording of claims, while desirable, would be an unreasonable burden to impose on an inventor."

H. C. Baxter & Bro. v. Great Atlantic & Pacific Tea Company (1 Cir. 1965), 352 F. 2d 87, affirming *H. C.*

Baxter & Bro. v. Great Atlantic & Pacific Tea Company (D. Me. S.D. 1964); 236 F. Supp. 601, cert. den. (1966), 384 U. S. 905. The Court of Appeals in a *per curiam* decision held that claims for a process patent of pretreating french fried potatoes so that they would fry to "a substantially even color" were invalid "because of the extent of experimentation required by one skilled in the art to ascertain their 'teaching.'" The District Court opinion relied upon authorities such as *General Electric* and *Standard Brands*. Question 2 of the petition filed in the October Term 1965, No. 958, urges error in that holding.

King-Seeley Thermos Co. v. Tastee Freez Industries, Inc. (7 Cir. 1966), 357 F. 2d 875, affirming *King-Seeley Thermos Co. v. Tastee Freez Industries* (N.D. Ill. E.D. 1965), 145 USPQ 596, cert. den. (1966), 385 U. S. 817. The court sustained claims where the specification did not describe a compressing function but the structure and operation of the machine which the patent discloses inherently resulted in that function. The petition filed in the October Term 1965, No. 1230 and October Term 1966, No. 140, raised the question as to whether that complies with U. S. Code, Title 35, Section 112.

Jones Knitting Corporation v. Morgan (3 Cir. 1966), 361 F. 2d 451, reversing *Jones Knitting Corp. v. Morgan* (E.D. Penn. 1964), 244 F. Supp. 219. The District Court citing *General Electric* and *United Carbon*, held invalid under the statute claims which used the term "heat insulating" on the ground that the term was a relative and comparative one which did not meet the statutory requirement. Relying on *Eibel Process*, the Court of Appeals held that the fact that the patent also uses a term

capable of only relative definition is not fatal and thus distinguished *General Electric, United Carbon* and others.

Gray Company v. Spee-Flo Manufacturing Corporation (5 Cir. 1966), 361 F. 2d 489, affirming *Spee-Flo Manufacturing Corporation v. Gray Company* (S.D. Tex. 1964), 237 F. Supp. 616. The Court of Appeals sustained claims while recognizing "The fact that some trial and error adjustments must be made to adapt the patent to the particular materials used, the pressure available, and the particular desired result. . ." The District Court invoked *Locklin* and *Binks Manufacturing Company* (237 F. Supp. 622).

Walt Disney Productions v. Niles Communications Center (7 Cir. 1966), ... F. 2d ....., 151 USPQ 528, modifying *Walt Disney Productions v. Fred A. Niles Communications Ctr.* (N.D. Ill. E.D. 1966), 253 F. Supp. 1. While reversing the District Court's determination that the patented claims failed to meet the test of non-obviousness, the Court of Appeals affirmed the determination of the District Court that claims did not violate Section 112 where they used the term "camera lenses" instead of the more precise term "lens nodal point" and where they used the word "substantially" to qualify the specifications of certain critical distances in the patent (See 253 F. Supp. 8-9). The District Court invoked *Briggs* and *Binks Manufacturing Company* in reaching that conclusion.